Reminiscences and Outlook

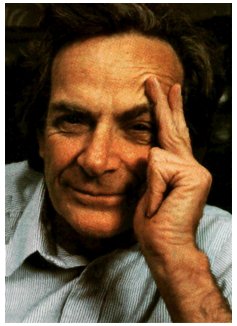
a personal, selected view on 30 years of H1

Past Times in Old Books
A bit of Science
Pictures
DIS in the 21st Century

Max Klein (H1 1985-2015)
U Liverpool and CERN

Colloquium at DESY Hamburg - 30th anniversary of the Approval of H1, 5.11.2015

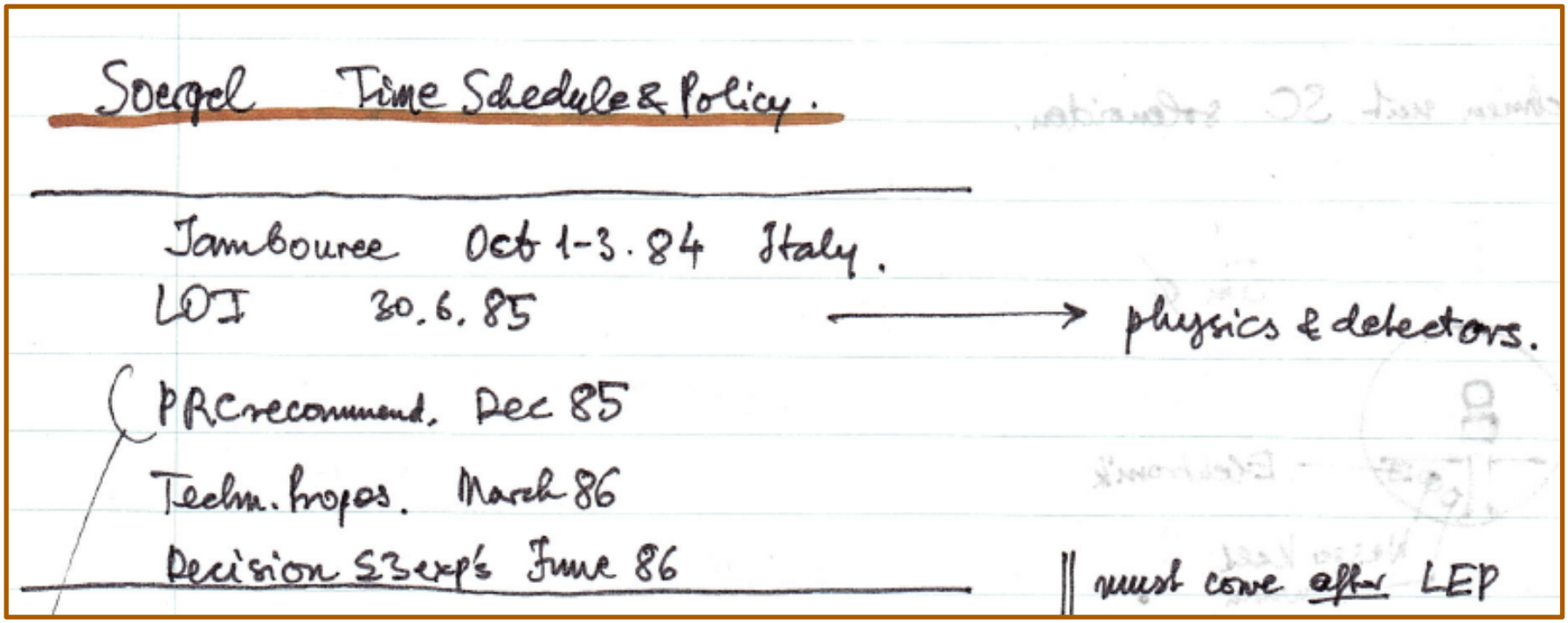
Feynman's Wisdom



[9]I would like to quote Feynman in a recent interview to the "Omni" magazine: "As long as it looks like the way things are built with wheels within wheels, then you are looking for the innermost wheel - but it might not be that way. in which case you are looking for whatever the hell it is you find!". In the same interview he remarks "a few years ago I was very sceptical about the gauge theories... I was expecting mist. and now it looks like ridges and valleys after all."

Cited: Abdus Salam
Nobel Lecture 1979

29th of May 1984



This and subsequent handwritten notes are taken from my logbooks

This is what we celebrate today
Soergel's 84 schedule held to 86
since HERA, H1, ZEUS sticked to it.

HERA. - Inf. Meeting.

May 29, 1984

V. Soergel.

6. April 84 : offizieller Start.

official call for letters of intent.

Obs. : Hochbetrieb wenig für Kollaborationen.

Finanzen für HERA - Maschine einigermaßen gesichert
fehlen noch Beträge, die an der Maschine mitbeteiligten, um 1990 fertig zu werden.

Wiik

complete construction	12.87
e ring	3.88
p	6.89
ep collisions	January 1990

need outside manpower!

820 × 30 GeV²
$0.6 \cdot 10^{32}$ cm^{-2} s^{-1}

free space for exp's	15 m	
	p	e
field	4.53	.185 T
particles	$2.2 \cdot 10^{13}$	$0.76 \cdot 10^{13}$
E range	300 ... 820	10 .. 33 GeV

13 MW

Theory

HERA Workshop Genoa Oct 1984

Di. 2.10.

R. Peccei A speculative look forward

$SU_3 \times SU_2 \times U_1$ many questions.

1) elementary Higgs $\Lambda_F = \langle\phi\rangle$ then need SUSY due to theoretical consistency
   $[SU_3 \times SU_2 \times U_1 \otimes SUSY]$
2) dynamical
   $SU_2 \times U_1$ breaking $\Lambda_F \approx \Lambda_{TC}$ new strong interaction
   $[\otimes G_{TC}]$
3) composite q's, l's $\Lambda_F \sim \Lambda_C$ preon bound states
   $[SU_3 \times SU_2 \times U_1 \otimes G_{preon}]$
4) composite W's $\Lambda_F \sim m_W$
   $[SU_3 \times U_1 \otimes G_{preon}]$

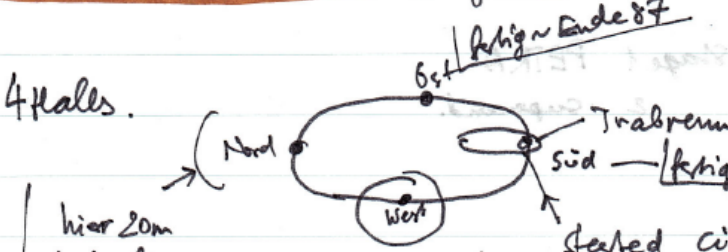
→ result. Beitrag von HERA: Erklärung, was die Fermi-scale ist!
theorists can not decide.

"theorists only prediction: there will be new physics."

?

G. Voss. Halls & Interaction Regions.

4 Halls.



trocken, Wasser tiefer!

hier 20m unter dem Wasserspiegel!

Stefed civil eng. 26.4.

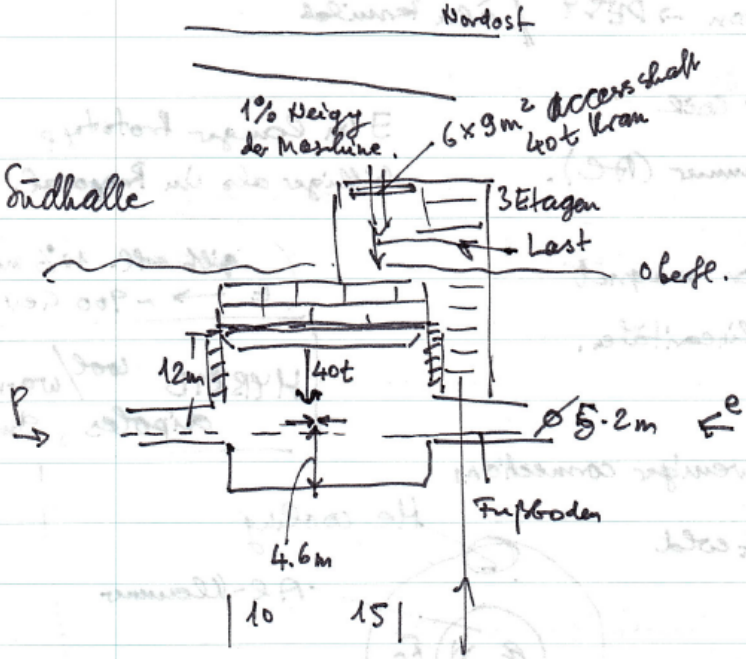
⇐ 1 Tunnel-bohrmaschine v ~ 15m/Tag.

Hallen in ~ 25m Tiefe

Tunnelgenauigkeiten.

± 20 cm Bögen

± 10 cm Geraden



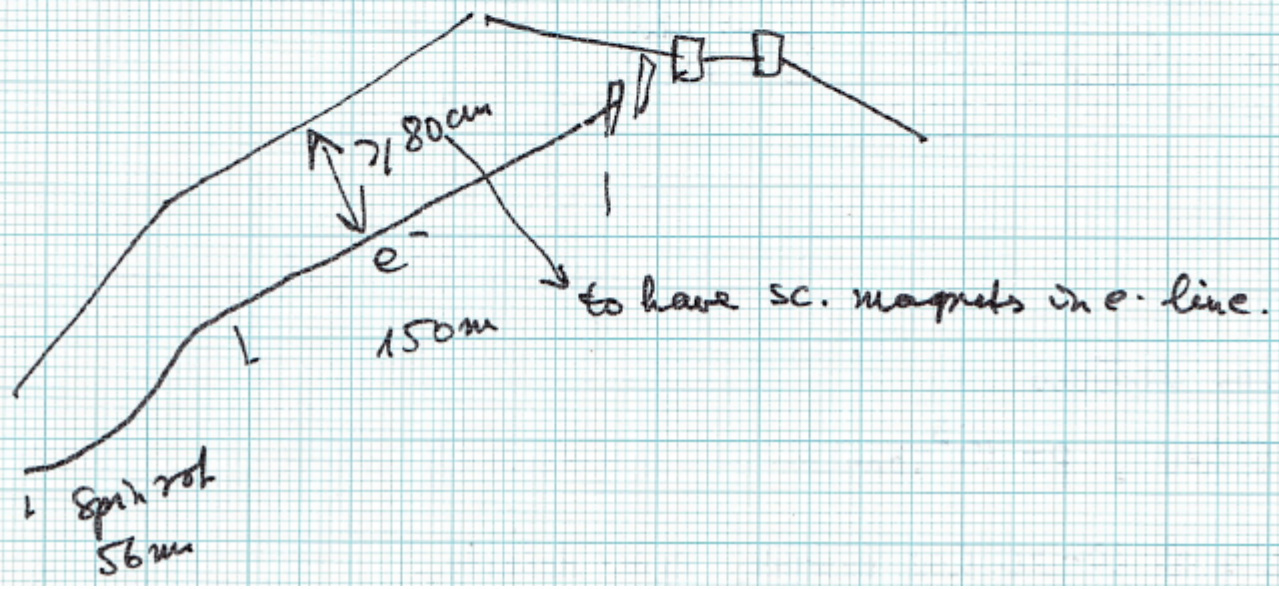
Stahl hat Neigg ~ 20 cm

haben private Firma engagiert, um optimalen Weg für Kabel zu finden (Detektor → Controllrooms)

W. Bartel Head-on collision geometry

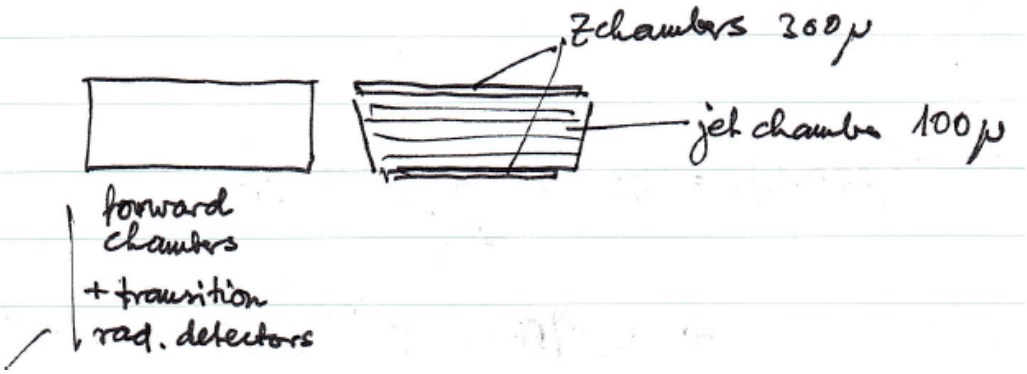
conflict: 1) like to separate e, p over short dist.
loss of $\mathcal{L}$ if q's move out
strong bends

2) " keep synch. rad. away



Detector Design

talk by Franz at
Genoa, 2.10.84



Vorteile von Ar: excellent calibration possibilities

$$\frac{\sigma}{E} = \frac{a}{\sqrt{E}} + b$$

- intercalibration of different towers
  ↳ small b !

no radiation problems

fine segmentation

Unification - Fall 1990

In the fall 1990 we unify CJC1 with COZ while
the two German states unite also – 25 years ago

Wohl faß ich, was mir offenbart;

Verstehst ist mir, warum Gott wollte haben,

uns zu glösen, gerade diesen Art

Dante Göttl. Komödie
' Paradies '

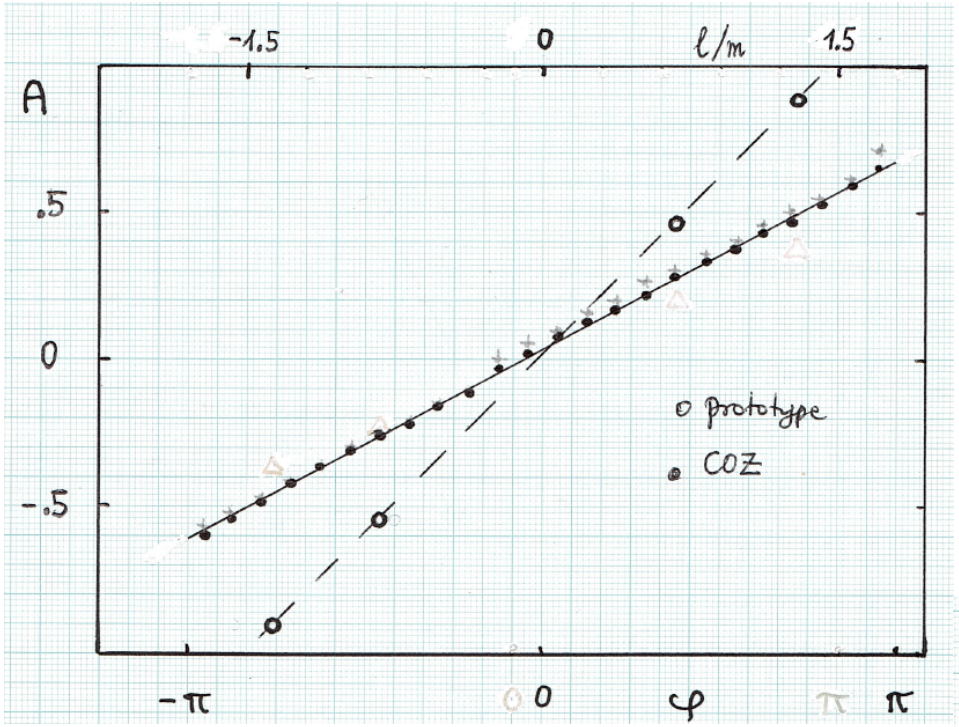
Date: TUE, 4 SEP 90 16:36:52 MEZ
From: Meissner <H1TMEI@DHHDESY3>
To: <H1KMAX@DHHDESY3>

Hallo Max!

CJC1 und COZ sind vereinigt.Die letzte Stuetzstange wurde soeben aus der CJC1 gezogen.Damit ruht nun die gesamte Last der CJC1-Draehte auf unseren Flanschen.Die Ursache fuer das gestrige Klemmen der Kammern war ein Dichtungsring der CJC1,der aus seiner Sollposition verrutscht war.Bevor die Kammern den Reinraum verlassen,sind noch ein paar Arbeiten zu erledigen:-Gasdichtigkeitstest an der CJC1
-Drahtspannungsmessung an der CJC1
-Umbau des Wagens,der beide Kammern aufnehmen soll
Beim Aufbau der Fuehrungsschienen fuer die Adapterkarten moechte ich dabeisein.Diese Arbeiten sollten wir auch nicht mehr oft wiederholen im Interesse der Vermeidung von Materialschaeden.Ich werde also voraussichtlich am Donnerstag noch nicht in Zeuthen sein koennen.

Viele Gruesse,Achim

Detector Preparations



$$A = \frac{Q_L - Q_R}{Q_L + Q_R}$$

prelim.
20.5.90

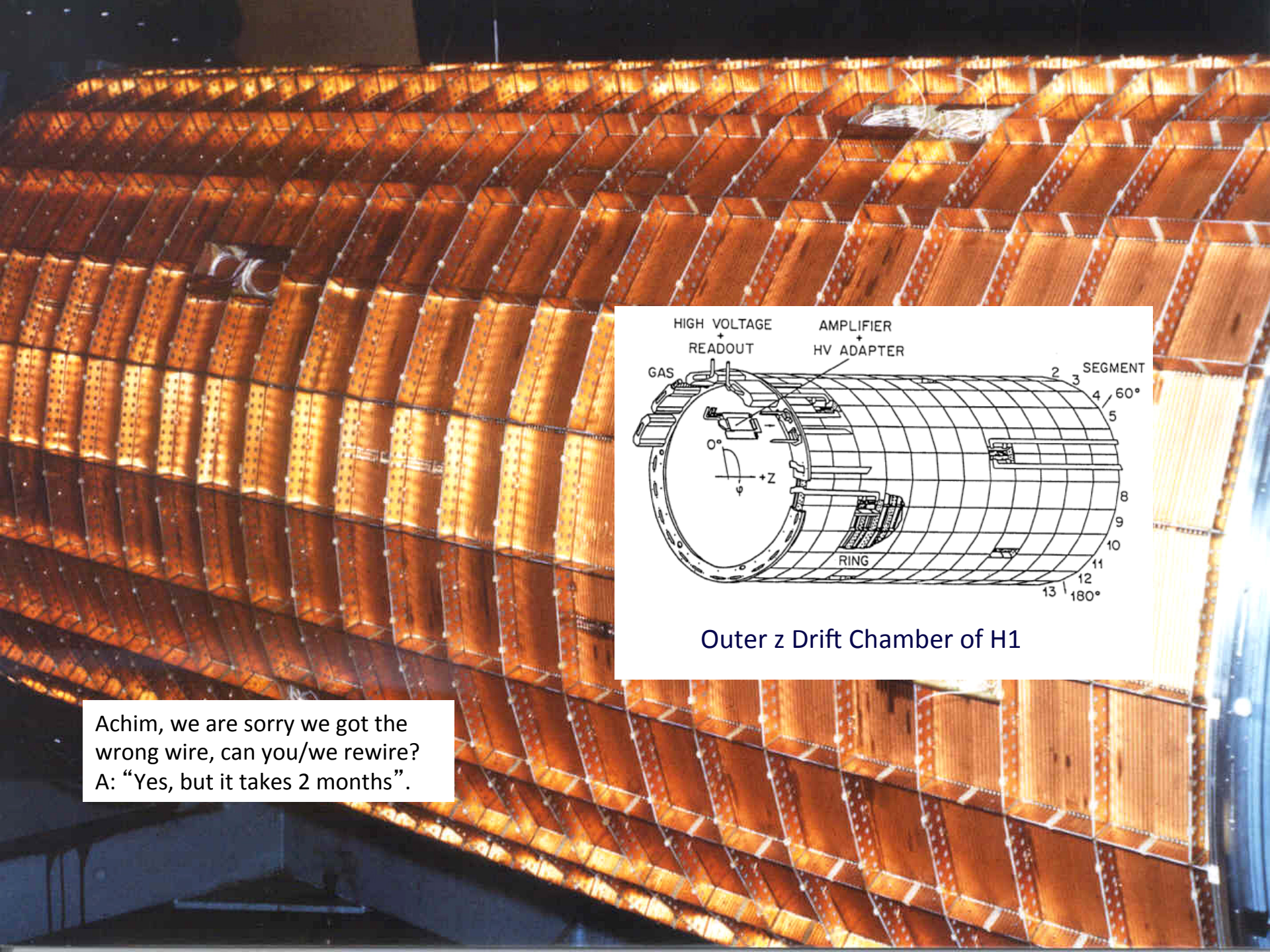
Ar / Propane

- Stablohm 48 μm ∅
  COZ .6 kΩ/m
- o Elgiloy 20 μm ∅
  P3 2.6 kΩ/m

$$\frac{\delta \ell}{L} = \frac{b}{2}\,\delta A$$

$$\frac{\delta \ell}{L} \approx 2\% \text{ (raw estimate)}$$

Special thanks to Peter Truoel and PSI for hosting the Zeuthen group for COZ prototype tests



Outer z Drift Chamber of H1

Achim, we are sorry we got the wrong wire, can you/we rewire?
A: “Yes, but it takes 2 months”.

TRACKING DETECTORS INSTALLATION

WILL YOU PLEASE INDICATE THE NAMES OF YOUR GROUP RESPONSIBLES FOR THE FOLLOWING SUB-SYSTEM

DETECTOR COMPONENT	CO2
GROUP / INST	/ Zeuthen
MECHANICAL COMP.	U. Harder
GAS SYSTEM	H. Bärwolff
PIPING GAS / WATER	J. Meißner / J. Meißner
CABLE LISTING	H. Lippold
ELECTRONIC RACKS	H. Lippold
HIGH VOLTAGE	H. ~~Lippold~~ Henschel
ASSEMBLY INTERGRATION AT DESY	U. Harder
SAFETY ASPECTS	H. Bärwolff

RETURN TO: EDDIE TOWNDROW
ROOM 332 BUILDING 1b
DESY

H1 relied on many very competent and dedicated engineers and physicists!

The burocracy was tolerable…

H1 in 1990

Plan for the installation of the BPC

Date: WED, 14 NOV 90 08:41:56 MEZ
From: Karlheinz Meier <F11MEI@DHHDESY3>
To: Max Klein <H1KMAX@DHHDESY3>
Subject: zeitplan

Karlheinz Meier
DESY – Group FH1K
Notkestrasse 85
D-2000 Hamburg 52
tel -49 40 8998 2028
fax -49 40 8998 3093

Zeitplanung fuer BEMC/BPC Installation

Meeting vom 12/11/1990 bei DESY

Teilnehmer: Brasse,Klein,Leuschner,Levien,Meier,Schirm

Der folgende Zeitplan von heute bis zur Installation/Verkabelung von BEMC und BPC wurde vereinbart :

Woche 47 – 48 (19/11/90 – 30/11/90)	Cosmic Test der BPC am ZWG
Woche 49 (3/12/90 – 7/11/90)	Transport BPC zum DESY (Montagehalle I. Inst.)
Woche 50 – 51 (10/12/90 – 14/21/90)	Tests BPC
2/ 1/91 – 9/ 1/91	Test Montage BPC/BEMC
10/ 1/91	Transport BEMC und BPC (getrennt !) zur N-Halle
14/ 1/91 – 15/ 1/91	Vermessung und Ausrichtung Grundgestell
16/ 1/91	BEMC Installation
17/ 1/91 – 18/ 01/91	Installation und Verkabelung der BPC auf dem BEMC
21/ 1/91	Einfahren von BEMC/BPC
22/ 1/91 – 28/ 1/91	Verkabelung BEMC (CDA) und Tests BEMC/BPC mit Zugang zur CDA

Norbert Langhoff
28.10.2015 – 80 y
Director of ZWG

The SSC in 1990

Wojcicki : 87 km ⌀ ~50 m unterirdisch

SSC

0.17°

Austin Chalk

Staub ist eher Problem als Wasser.

6.6 T
15.8 m std length dipole

6.5 kA

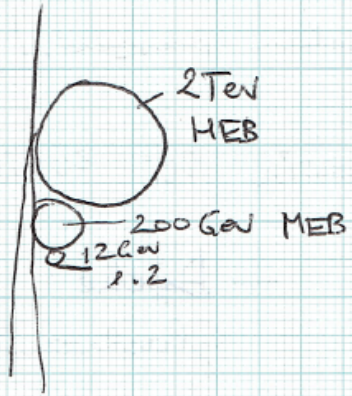
Freedman SPC science policy

Sandweiss PAC program advisory.

2.7 kA/mm² J_c
NbTi
6 µm Draht ⌀

4 Jahre Magnetentwicklg
von Fermilab-Magneten.-

1 Ferrari / Magnet.



beam-beam tune shift
(head on and long range)
limits $\mathcal{L}$ to $10^{34} * 2$
at $\sqrt{s} \sim 35$ TeV

nominal
$\mathcal{L} = 1.6\ 10^{33}$ peak.

1.5 events / collision.

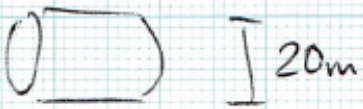
The SSC in 1990

Juni 82 : Intellektuelle Geburt
Jan. 87 endorsed by R. Reagan
Dez 88 Texas site chosen
May 90 14 expressions of interest

Nov. 90 recommendations on EOI's.

1st proposals end of 91 due (tentative)

4 4π detector
Solenoid Trilling
toroid Calor. Sulah
L* Ring.



Fort Worth (good old cowboy town).
Dallas (artificial Hill Emulsions.

2 high Lumi

3 B physics

5 specialized.

A president, 14 LoIs, a tunnel, magnets..:
and yet no success – a long term disease

H1 Meeting on Cross-Section Measurement

January 22nd, 9 a.m.- 6 p.m., sem.room 4, DESY

Agenda (preliminary)

1. Final State Deep Inelastic Physics
- MPI

2. Inclusive E and Θ Measurements - Resolution, Calibration, Efficieny
- P.Schacht: jet energy
- J.Ferencei: electron energy
- S.Maxfield/T.Naumann: Θ and p measurement with the tracking detectors

3. Measurement of Q^2 and x
- G.Bernardi: (Q^2, x) resolution with hadrons
- J.Blümlein: cross calibration of e and jet measurements
- E.Binder: estimation of smearing correction with PSI (e and h)

4. Event Selection
- M.Goldberg: separation of NC/CC
- L.Wormsley: e/π separation
- N.Huot, S.Levonian: photoproduction background

5. Luminosity and Trigger
- S.Levonian: accuracy of luminosity measurement
- U.Straumann: dead-time corrections
- A.deRoeck: triggers on inclusive DIS (efficiency and redundancy)

6. Requirements from Electroweak Physics on Cross Section Analysis
- D.Haidt

7. Radiative Corrections
- W.Krasny: experimental control of radiative corrections
- T.Riemann: uncertainties of NC and CC rad.corr. calculations

8. Discussion of Procedures to Derive the Inclusive Cross Sections
- W.Krasny: iteration procedures
- M.Klein: xsection measurement in BCDMS

...

More physics oriented talks (parton distributions, R measurement, running strategies, cross section analysis ...) will be left to the HERA workshop or/and other times.

15.12.90 G.Bernardi, J.Feltesse, D.Haidt, M.Klein, W.Krasny, S.Levonian

HERA moves on to prepare its physics

Date: WED, 31 OCT 90 15:38:46 MEZ
From: <F11EIS@DHHDESY3>
To: Max Klein <H1KMAX@DHHDESY3>
Subject: MAIL from F11EIS at DHHDESY3

Franz Eisele DESY-FH1K
H1 Collaboration DESY , spokesman
Notkestrasse 85, D 2000 Hamburg 52, Germany
Tel. (040) 8998-3086 (secretary ext. 3144/3015)

attached a proposal for convenors for the new HERA working groups.
I hope that you will be able to accept this task.

H1- convenors for the HERA working groups (joined effort with theory and ZEUS) F. Eisele

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The following people have been nominated by the executive committee:

WG1: structure functions: Max Klein,Zeuthen(at DESY)
WG2: QCD at low x: J. Feltesse Saclay (at DESY)
WG3: radiative corrections W. Krasny ,Saclay (frequently at DESY)
WG4: electroweak physics: D. Haidt, DESY
WG5: photoproduction: S. Levonian, Lebedev Inst. Moscow (at DESY from nov. 15. 1990)
WG6: heavy quarks: P. Truoel, Univ. Zuerich
WG7: Jets and hadronic final states: K.H. Meier, DESY
WG8: ———
WG9: beyond standard model: Ch. Berger, Aachen
generators: G. Grindhammer ,MPI Munich (at DESY)

CB. 13.12.1990

Soergel

may: polarization studies, SC cavities installed

TRISTAN has λ
LEP too

good polarization and $\mathcal{L}$ seem
to exclude each other. | Hermes may run dedicated.

PRC has recommended to approve HERMES, if dedicated dont give them more than 10%
directorate: accept HERMES after
demonstration of λ (not before
end of June).

$\lambda_i \sim 60\%$ min | rotation diminishes λ bei 10-15%

rolling in only after
E_p up and backgrounds
understood
1st of August

maintaining of the DESY magick is
not likely
| new budget not before
Easter

4wire OR μ trigger (4π)
for μ's ($\mathcal{J}, W, b \ldots$)

may be new gästehaus
starting in 91

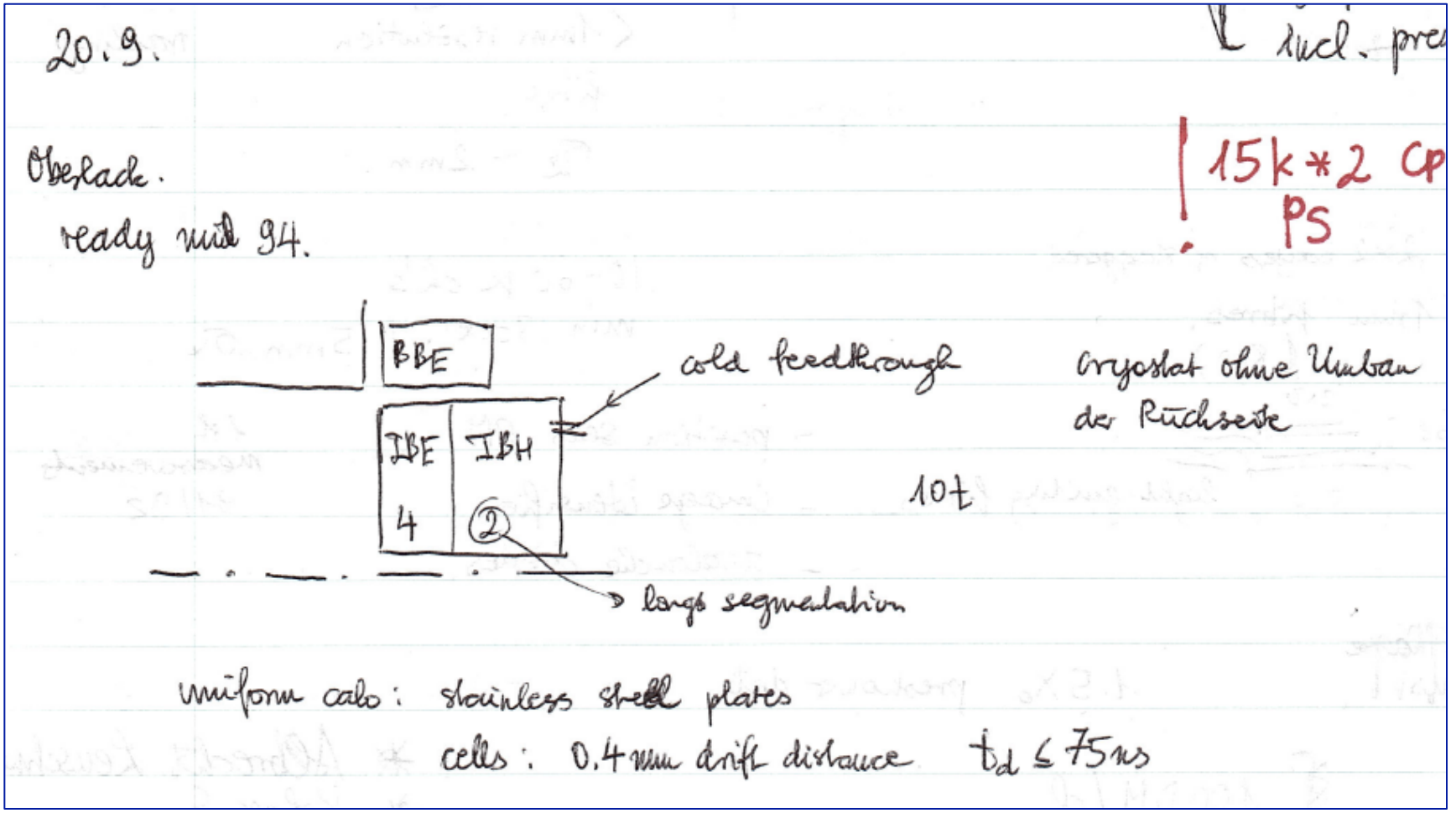
upgrade: Si drive in, H1 must
accept new collaborators

relative priorities in funding must
be decided on.

find another group for Queen Mary.
Aachen I+III

| expects TP until spring 92.
CO2 muß gehen!!

Backward Upgrade – Calorimeter - 1991



H1 CB decided for Spacal

HERA workshop.
29/30.10.1991

deadline for proceedings
6.1.1992 out 1.3.92

Wiik : lowest L ever recorded.

: $3.7 \cdot 10^{10}$ $e^{\pm}$ / bunch in 210 bunches 96 ns apart 58 mA

10^{11} p / bunch " "

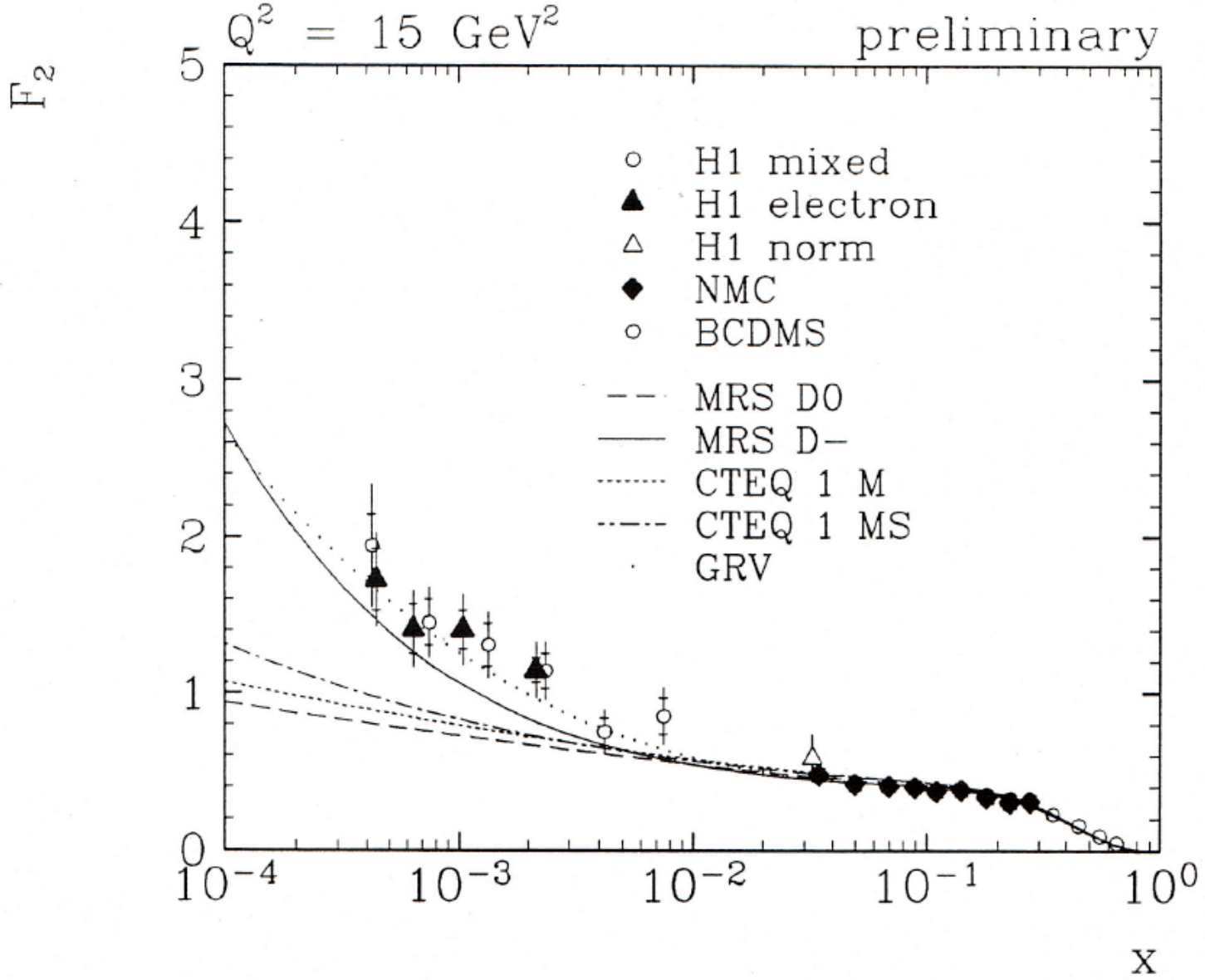
19.10.91, 18^{50} 1st ep collisions.

12 Ee x 480 Ep
$1.03 \cdot 10^{26}$ ±13% $cm^{-2}s^{-1}$

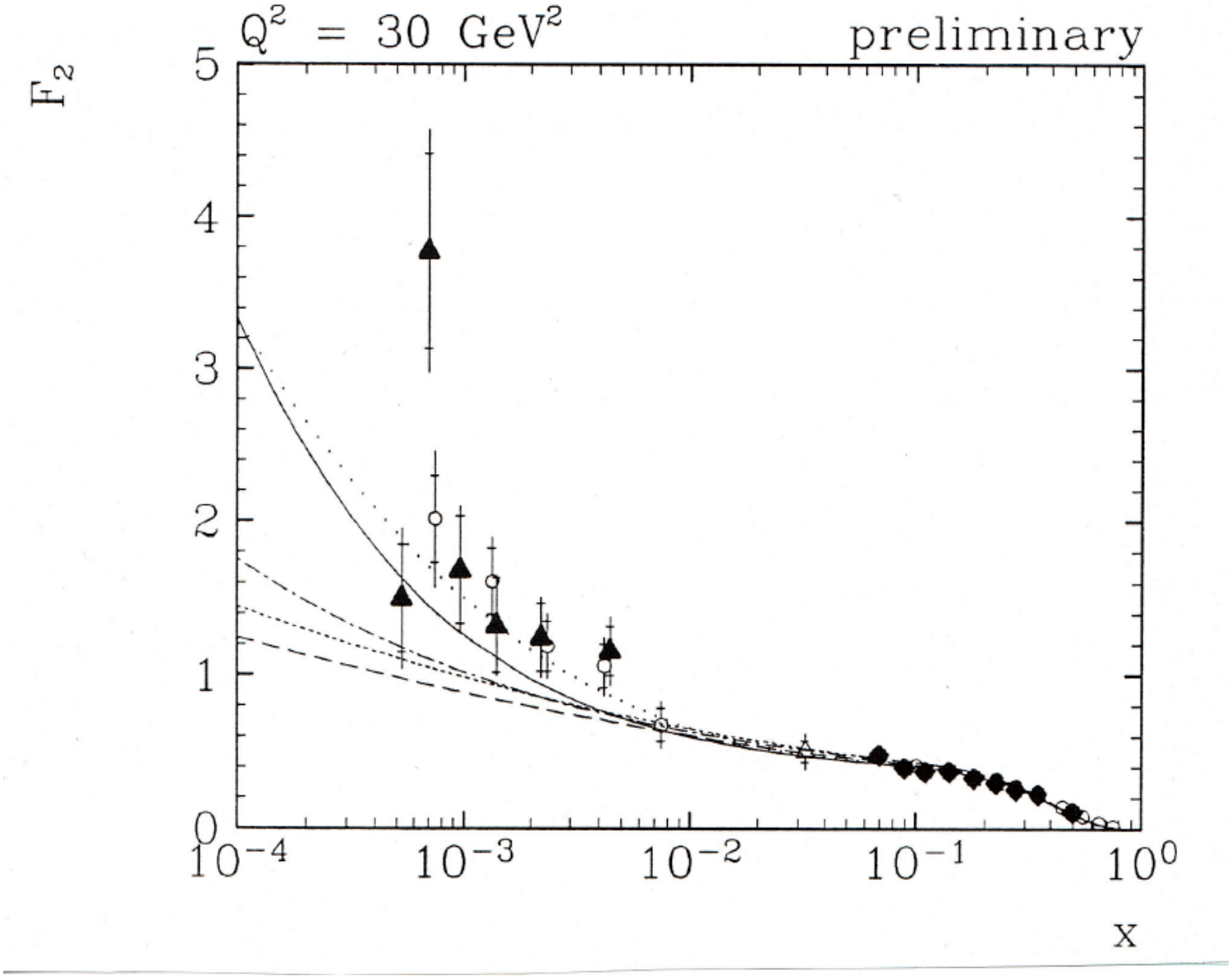
useful $\mathcal{L}$ late spring.

HERA works !

Moriond 1993



Moriond 1993



Monond.

KVARIABLE=1 EE 2 EM 1
KBINNING=1 QX 2 QY 1

Q2= 7.50000000

X	FT	+-ST	+-SY	D0	D-	R	NEV	ACC	SXY	RCO	BSC	KAP	Y	EFVTX
MODE :			47 ,	for MRS Set D- (L215) Structure Functions										
0.00024	1.54	0.14	0.28	0.65	1.55	0.61	124	0.560.487E+06		0.15	0.836	13268.1	0.3611	0.900
0.00042	1.00	0.11	0.13	0.62	1.23	0.57	79	0.570.375E+06		0.14	0.616	8902.6	0.2032	0.990
0.00075	0.95	0.13	0.20	0.60	0.99	0.53	54	0.480.399E+06		0.16	0.490	5499.5	0.1142	0.950
0.00133	0.65	0.12	0.07	0.58	0.82	0.48	28	0.410.275E+06		0.12	0.414	3253.9	0.0642	0.990

Q2= 15.0000000

X	FT	+-ST	+-SY	D0	D-	R	NEV	ACC	SXY	RCO	BSC	KAP	Y	EFVTX
0.00042	1.64	0.16	0.29	0.81	1.55	0.43	106	0.820.125E+06		0.15	1.069	1789.8	0.4064	0.800
0.00075	1.52	0.13	0.20	0.76	1.23	0.41	136	0.780.140E+06		0.15	1.094	1220.5	0.2285	0.940
0.00133	1.00	0.10	0.16	0.71	1.00	0.38	97	0.800.102E+06		0.14	1.089	761.8	0.1284	0.900
0.00237	0.90	0.10	0.17	0.67	0.82	0.34	74	0.710.945E+05		0.11	0.923	454.0	0.0722	0.990

Q2= 30.0000000

X	FT	+-ST	+-SY	D0	D-	R	NEV	ACC	SXY	RCO	BSC	KAP	Y	EFVTX
0.00075	1.90	0.23	0.31	0.94	1.47	0.33	71	0.880.350E+05		0.17	1.022	240.0	0.4569	0.930
0.00133	1.18	0.15	0.18	0.86	1.18	0.31	58	0.890.262E+05		0.14	1.104	166.7	0.2568	0.930
0.00237	1.30	0.16	0.19	0.78	0.95	0.29	66	0.900.325E+05		0.14	1.099	105.4	0.1444	0.850
0.00421	0.89	0.13	0.21	0.71	0.79	0.26	49	0.870.229E+05		0.10	1.027	63.3	0.0813	0.990

Q2= 60.0000000

X	FT	+-ST	+-SY	D0	D-	R	NEV	ACC	SXY	RCO	BSC	KAP	Y	EFVTX
0.00133	0.00	0.13	0.21	1.00	1.35	0.26	28	0.710.229E+05		0.17	1.620	32.1	0.5135	0.000
0.00237	1.28	0.23	0.15	0.90	1.08	0.24	31	0.870.691E+04		0.14	1.112	22.7	0.2889	0.960
0.00421	1.07	0.20	0.15	0.80	0.88	0.22	30	0.870.650E+04		0.13	1.106	14.6	0.1626	0.990
0.00750	1.19	0.19	0.28	0.72	0.74	0.20	39	1.090.752E+04		0.09	1.090	8.8	0.0914	0.900

→ 1042 events in the first F_2

Work after Moriond 93

GB, ADR, TN, NW, US, MK 29.4.

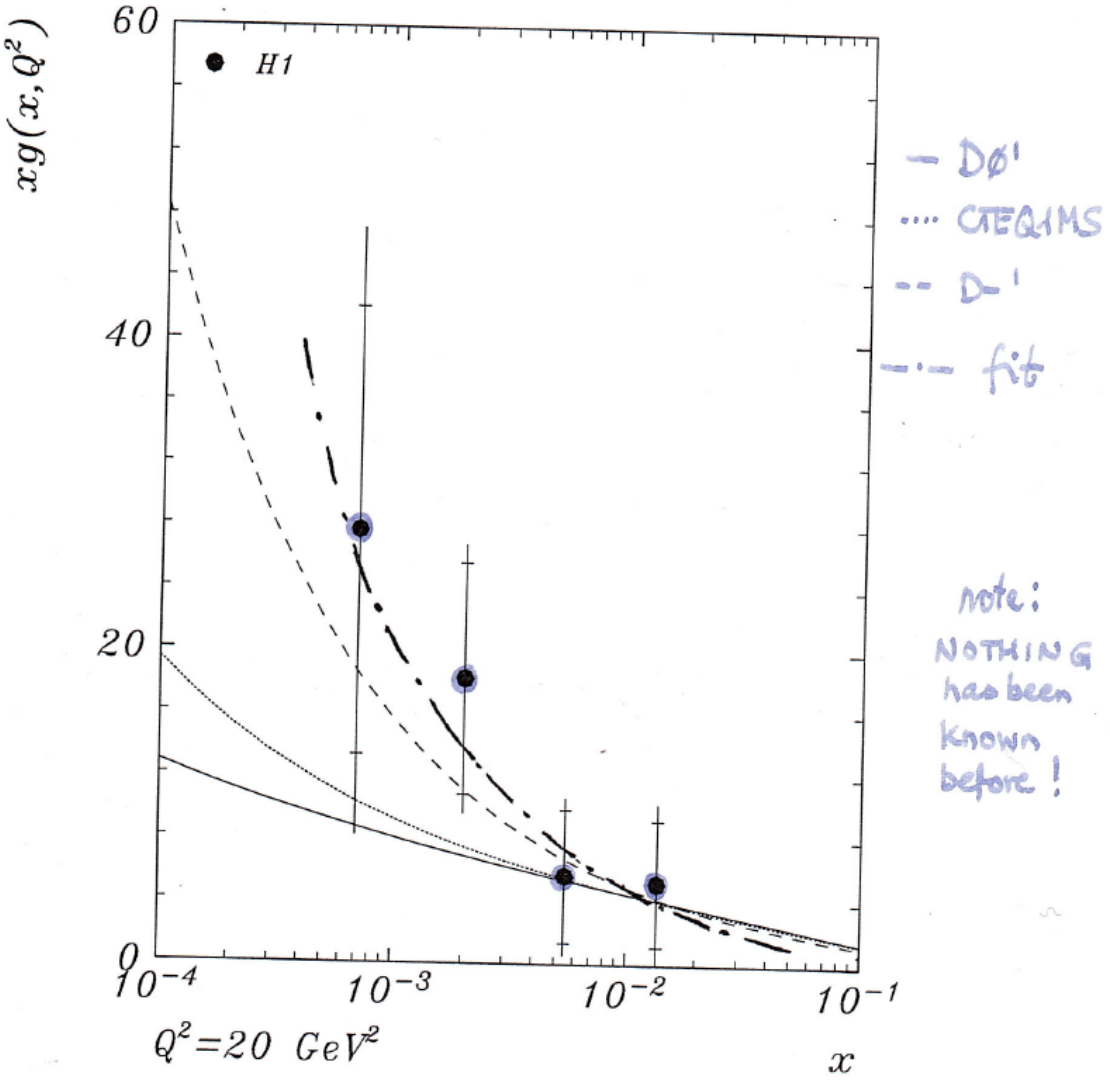
questions / jobs

- D^-, γp mc's. example $(D^-) \rightarrow$ DEST rec. D^-
- get F_2 with D^0 and D^-.
- vtx efficiency satelite events? $z \neq 0$ file → scan
  MC acc (z). z distr. data to max $|z|$
- TOF (γp 99% Dis loss ?)
- ϑ cut values BEMC.
  ⋯→ estimate bgd with MC (PYTHIA RAPIDM) z_{vtx} smearing
- use mDST6? get Ntuples & compare (normalized) E, ϑ distri's with DST5
- hadronic energy: BEMC fraction in x, Q^2 bins / fractions on y
  noise? higher track fraction
- correct y: over compensated Y_Σ (5-10%)?, $Y_{DA} - Y_\Sigma - Y_e$ rad in/out
- y resol. in $x Q^2$ bins?
- smearing effect: net smearing for D^-, D^0 and pure smearing.
- measure/control RC? $Q^2 \rightarrow 0$ ⋯
- Source of γp bgd in Monte Carlo
- get E, ϑ distributions, normalized both selections

The rising gluon

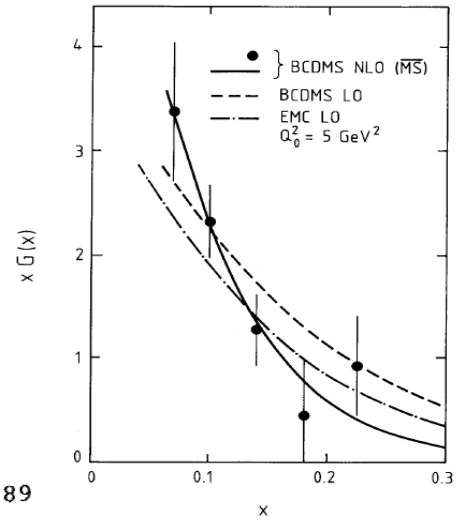
this is

Look, – $xg(x,Q^2)$



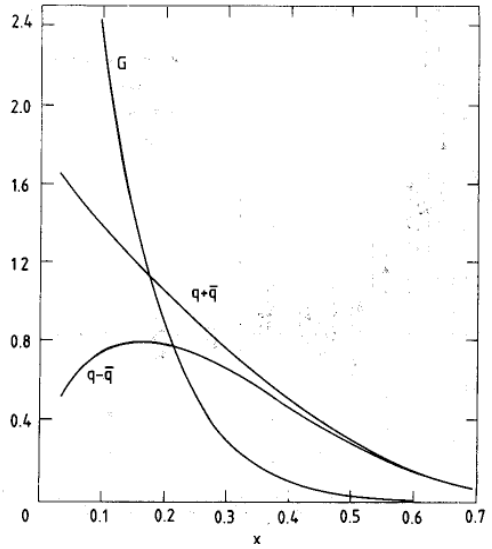
Gluons and Quarks 1989 → 2015

BCDMS



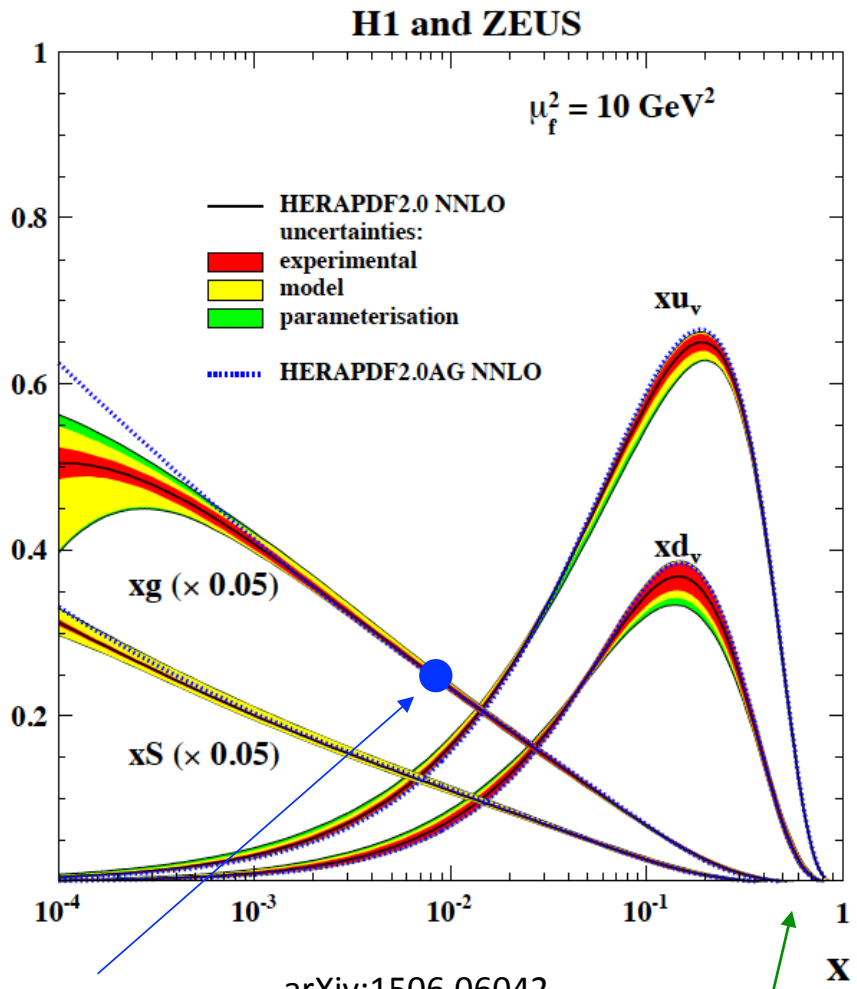
CERN-EP/89-07
January 17th, 1989

fixed target lN to ep collider →



CDHS

CERN-EP/89-103
15 August 1989

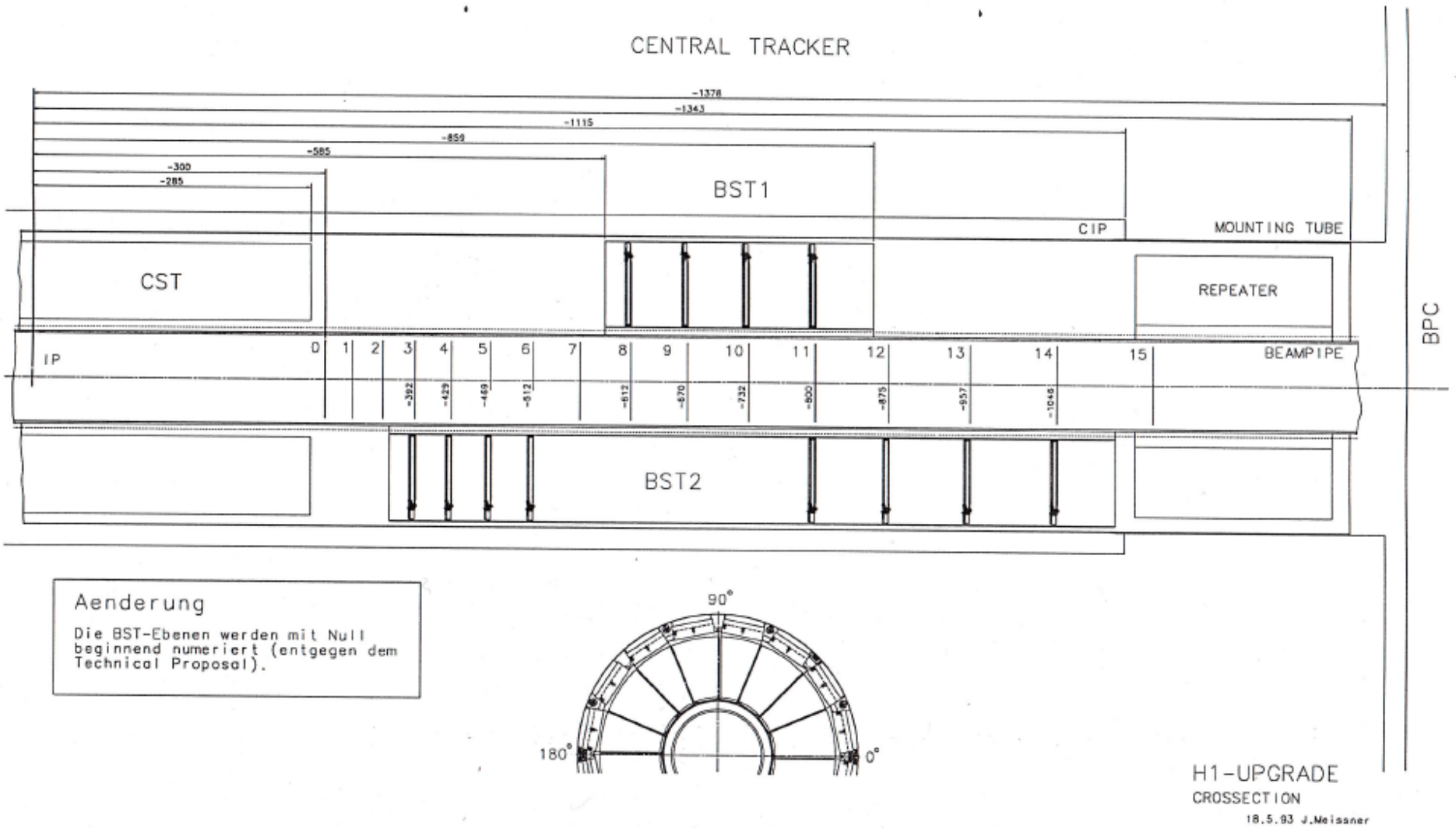


gg→H
(y=0)

arXiv:1506.06042
"Legacy" paper NC/CC
HERAPDF2.0 NNLO

High mass
HL-LHC

After Moriond 1993



The four most frequently cited publications of the H1 Collaboration

Deep inelastic inclusive e p scattering at low x and a determination of alpha(s)
H1 Collaboration (C. Adloff *et al.*). Dec 2000. 68 pp.
Published in **Eur.Phys.J. C21 (2001) 33-61**
DESY-00-181
DOI: 10.1007/s100520100720
e-Print: **hep-ex/0012053** | **PDF**

Cited by 629 records 500+

A Measurement and QCD analysis of the proton structure function f2 (x, q2) at HERA**
H1 Collaboration (S. Aid *et al.*). Mar 1996. 35 pp.
Published in **Nucl.Phys. B470 (1996) 3-40**
DESY-96-039
DOI: 10.1016/0550-3213(96)00211-8
e-Print: **hep-ex/9603004** | **PDF**

Cited by 510 records 500+

Measurement of the proton structure function F2 (x, Q2) in the low x region at HERA**
H1 Collaboration (I. Abt *et al.*). Aug 1993. 20 pp.
Published in **Nucl.Phys. B407 (1993) 515-538**
DESY-93-117
DOI: 10.1016/0550-3213(93)90090-C

Cited by 430 records 250+

A Measurement of the proton structure function f2 (x, Q2)**
H1 Collaboration (T. Ahmed *et al.*). Jan 1995. 32 pp.
Published in **Nucl.Phys. B439 (1995) 471-502**
DESY-95-006
DOI: 10.1016/0550-3213(95)98236-U
e-Print: **hep-ex/9503001** | **PDF**

Cited by 330 records 250+

Status 29.10.15 note HERAPDF1.0 has 646

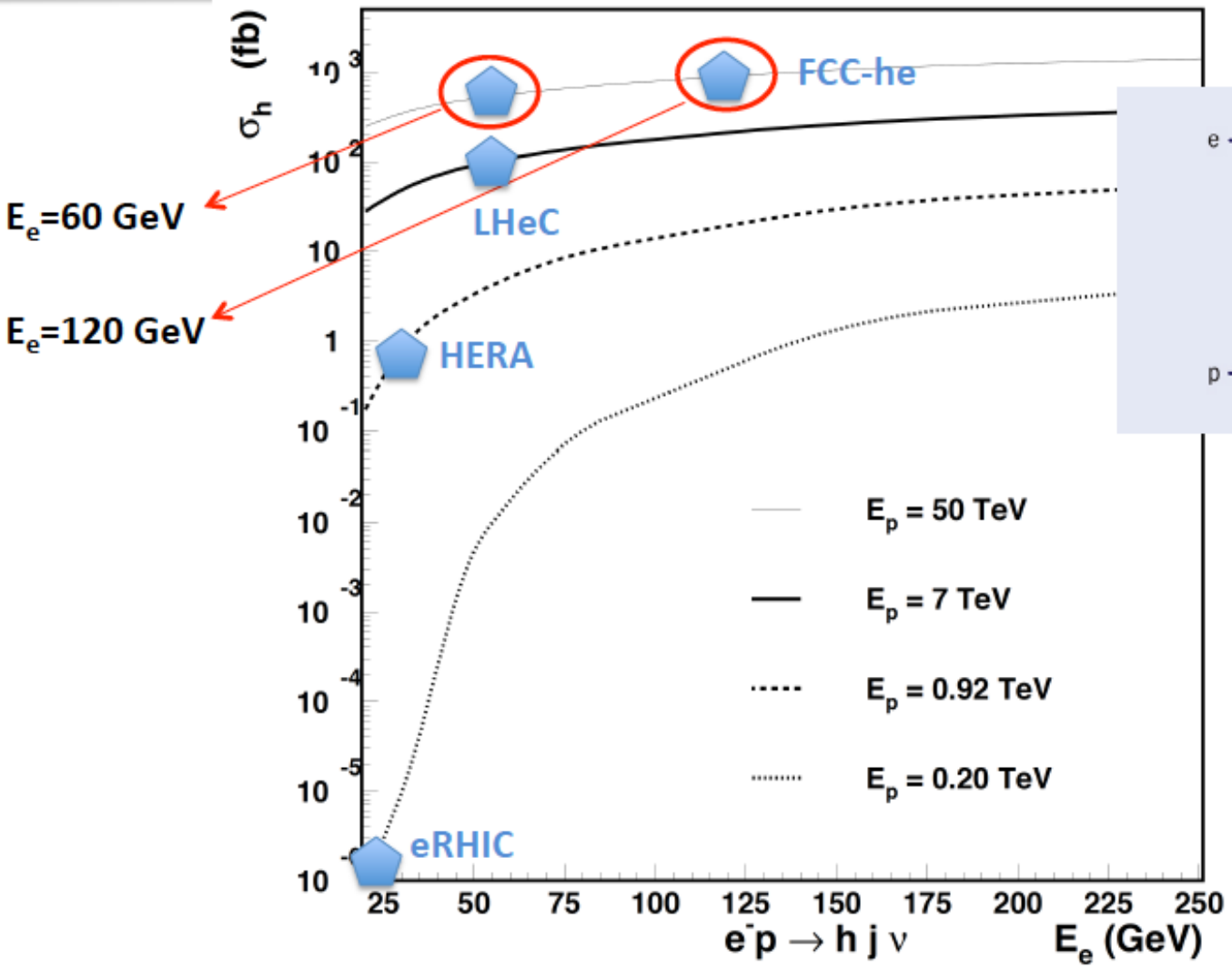
F_2 (1992+93)

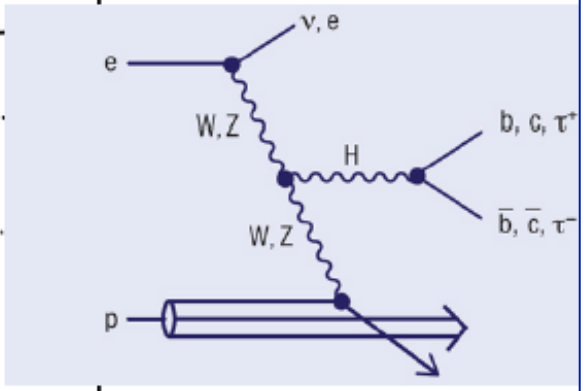
F_2 (1994 + 2000)

The famous 4 papers belong to all of H1. I had the privilege to co-write all, and in coming to low Q^2 work with a most remarkable guard of young students, including also others who are not shown. and also well known colleagues.

F_2(1996/97)

SM Higgs in ep





We missed 1000 times luminosity to discover the Higgs at HERA -MK

LHeC / FCC-he: Sizeable charged current DIS unpolarised **ep cross sections**

Last 9o'clock meeting, July 1st, 2007

Max Klein H1-30

(some of [my]) HERAs HEROs

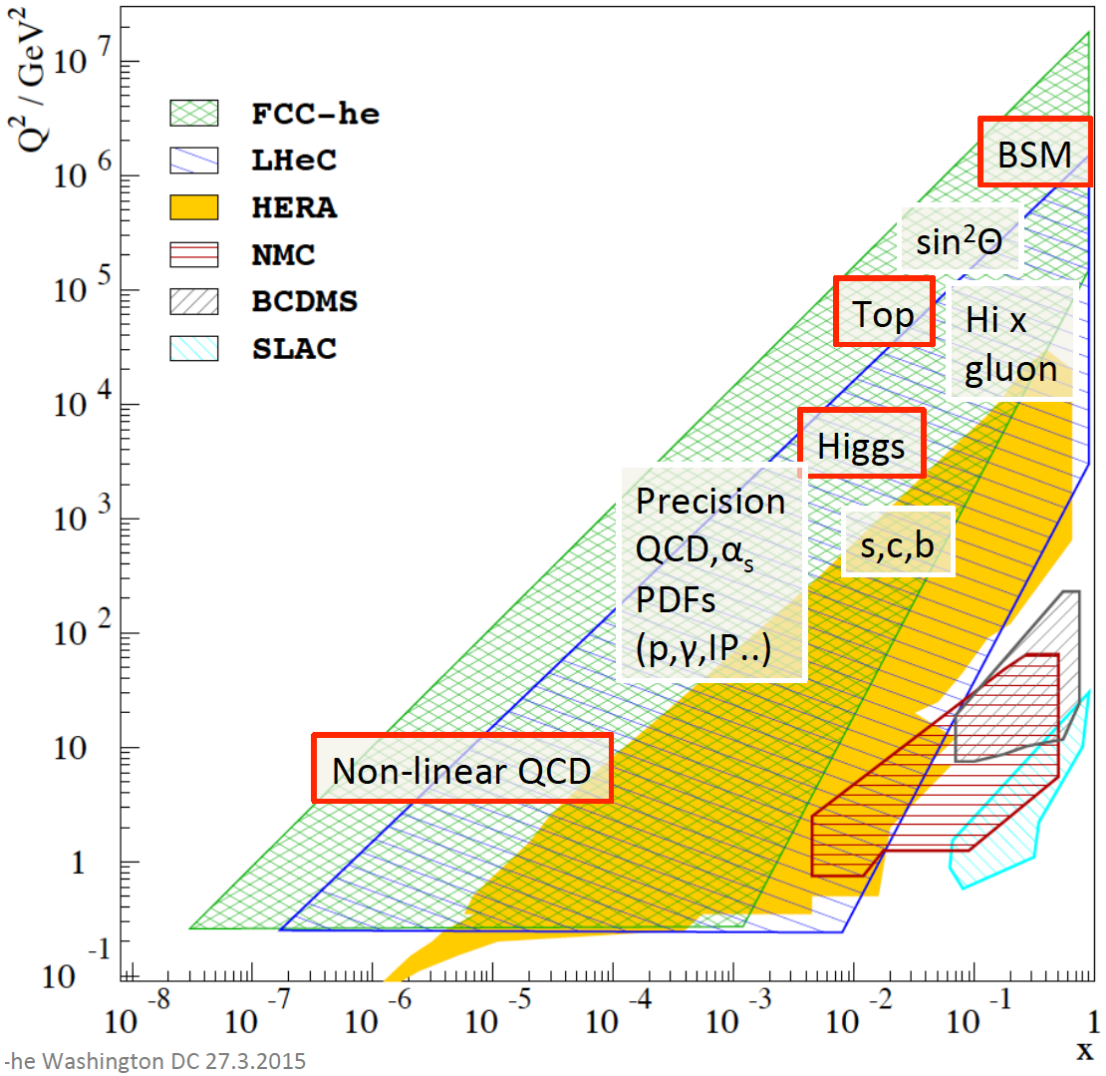
17.2.1937-26.2.1999

A. Febel, H. Gerke, M. Tigner, H. Wiedemann, and B. Wiik, *The proposed desy proton-electron colliding beam experiment. (talk)*, IEEE Trans.Nucl.Sci. **20** (1973) 782–785.

B. Wiik et al., *PROPER - ep with PETRA*, DESY preprint 38 (1977).

J. R. Ellis, B. Wiik, and K. Hubner, *CHEEP: An e-p Facility in the SPS*, CERN Yellow Report NN (1978).

LHC Electron Beam Upgrade

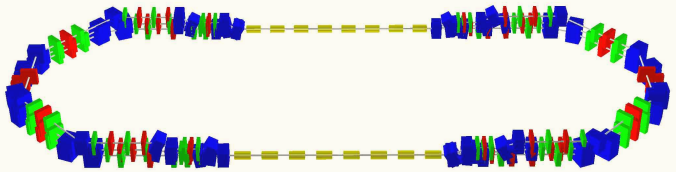


-he Washington DC 27.3.2015

Luminosity of order 10^{34}cm^{-2} s^{-1} in concurrent ep-pp operation

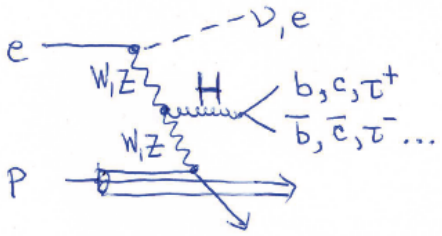
LHeC

-Finest microscope of the world
-The next machine which sees H
-Transforms LHC in precision lab.
-PDFs gain O(.5)TeV search range
-Revolution of nuclear structure



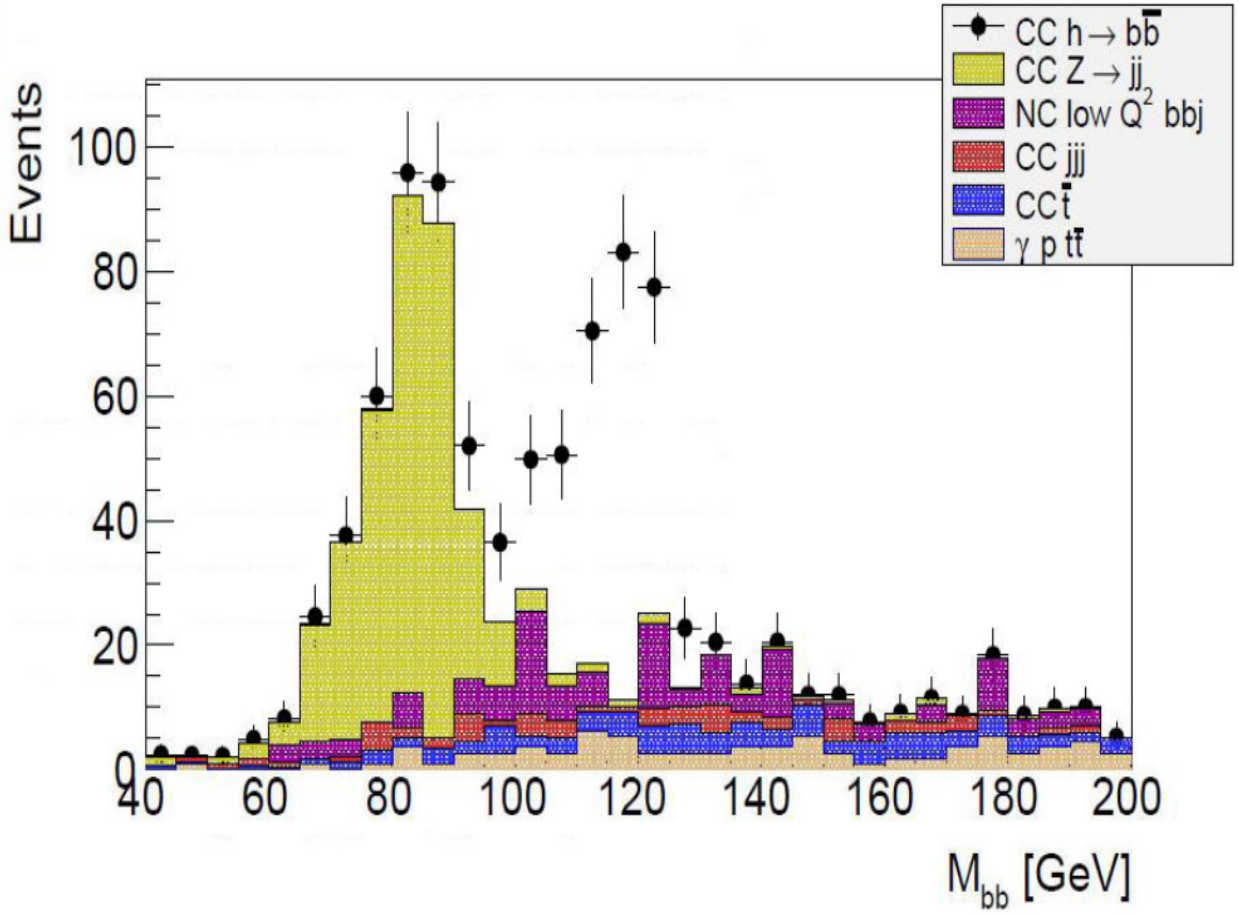
ERL Facility:
Two LINACS 150 MeV, 3 passes with energy recovery → 900MeV

Design Concept 2015
AsTEC, BINP, CERN, Jlab + scRF, ERL, Physics, Tests



Higgs in ep → νHX

Simulation of H→ bb Measurement at the LHeC, 100fb^{-1}



ep→ νH(bb)X
charged currents
σBR~120 fb
μ=0.1
S/B ~1-2
Cut based only

[LHC: VH - BDT's
σ(VH) ~ 130fb 8 TeV
arXiv:1409.6212]

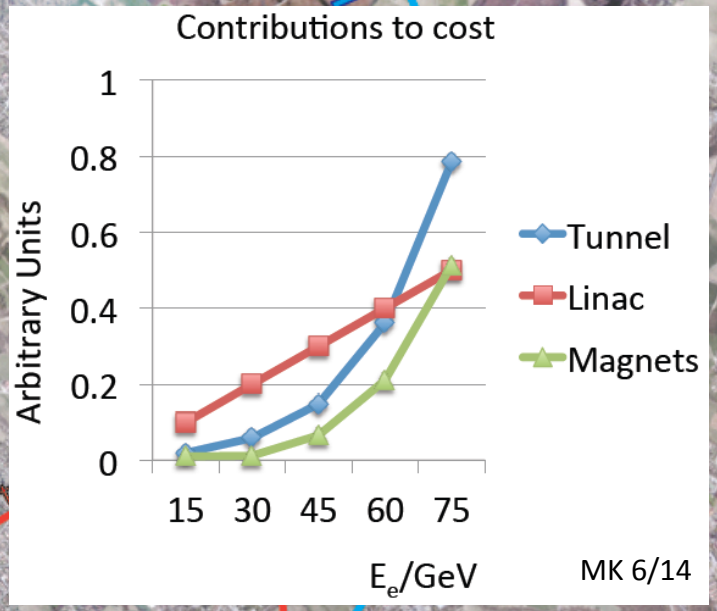
LHeC Higgs Group U.Klein et al.

This reconstructs 60% of H in ep with very comfortable S/B ~1 , in CC and NC
→ O(1)% precision on H-bb couplings with matching theoretical uncertainty]

Civil Engineering Footprint

LHeC construction planning	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
Land negotiations							
Environmental Impact Study							
Building permits							
Detailed design & tendering							
Construction							

7 years for 9km Civil Engineering



LHC

1/3 Pt2 CDR

1/4 Pt2

1/5 Pt2

Prevessin Site

SPS

1/3 Pt

Pt 2

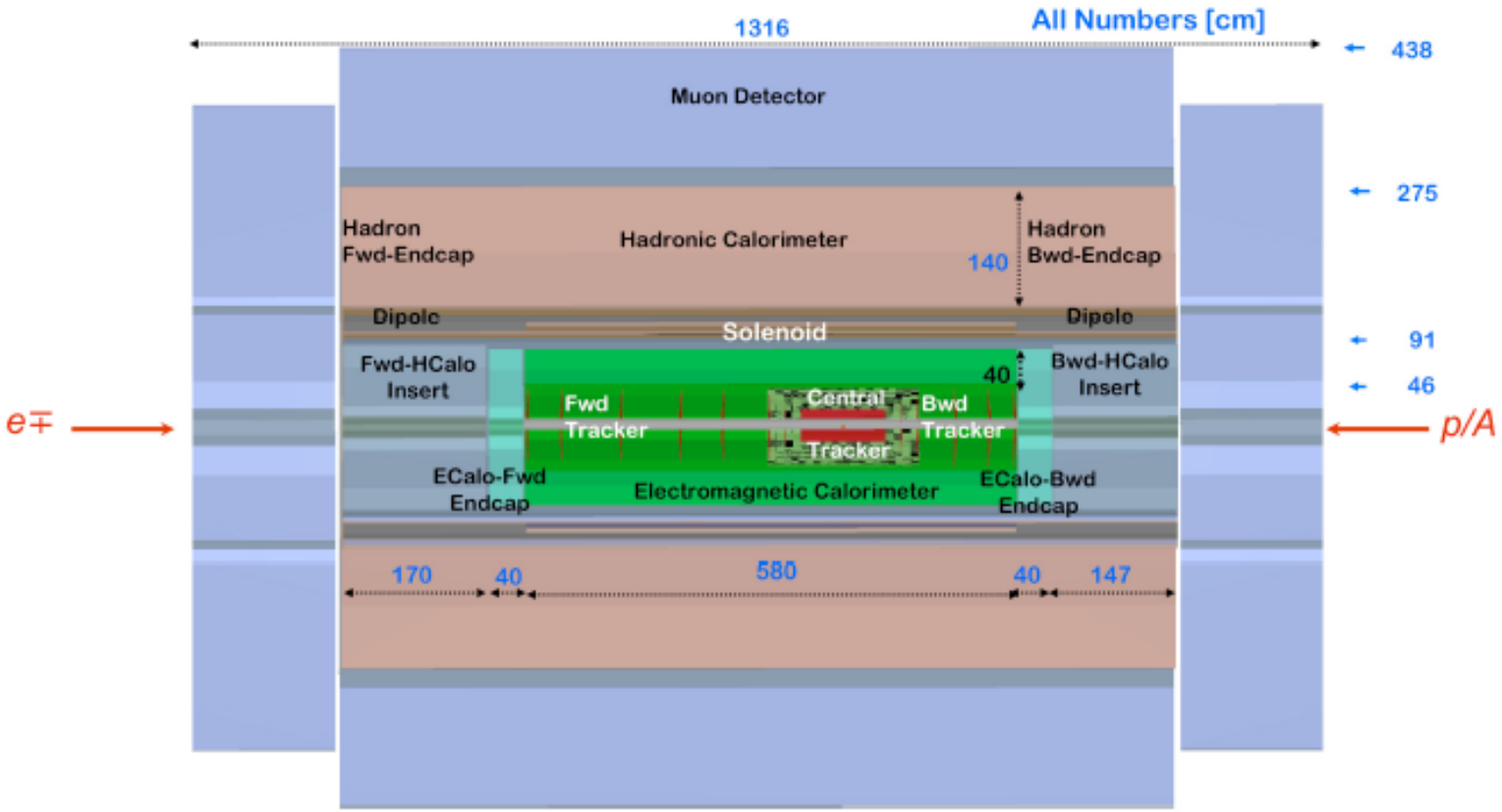
Pt 1

Meyrin Site

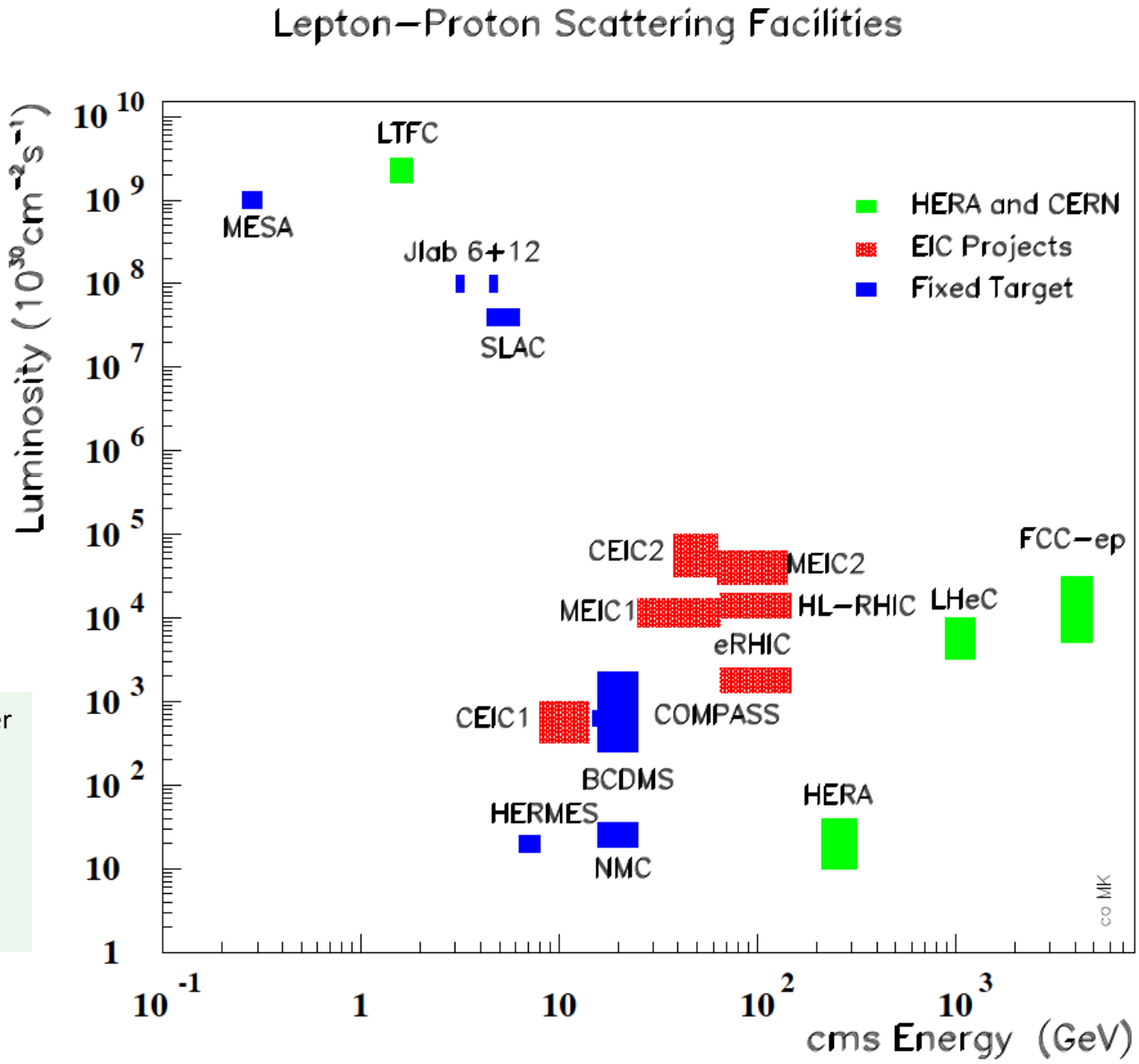
Pt 8

LHeC
Civil Engineering
Different Options
Fraction 1/3-1/4-1/5
Pt2 and Pt8
J.OSBORNE/L.FAISANDEL GS-SE-DOP

Detector description.



- Forward / backward asymmetry reflecting beam energies (870mm offset)
- Dipole for head-on e-p collisions and central solenoid in common cryostat
- Eta coverage = from -4.5 (backward) to 5.1 (forward)
- Present size 14m x 9m (c.f. CMS 21m x 15m, ATLAS 45m x 25m)



From CERN Courier
MK, H.Schopper
June 2014

With input from
A.Hutton, R.Ent,
F.Maas, T.Rosner

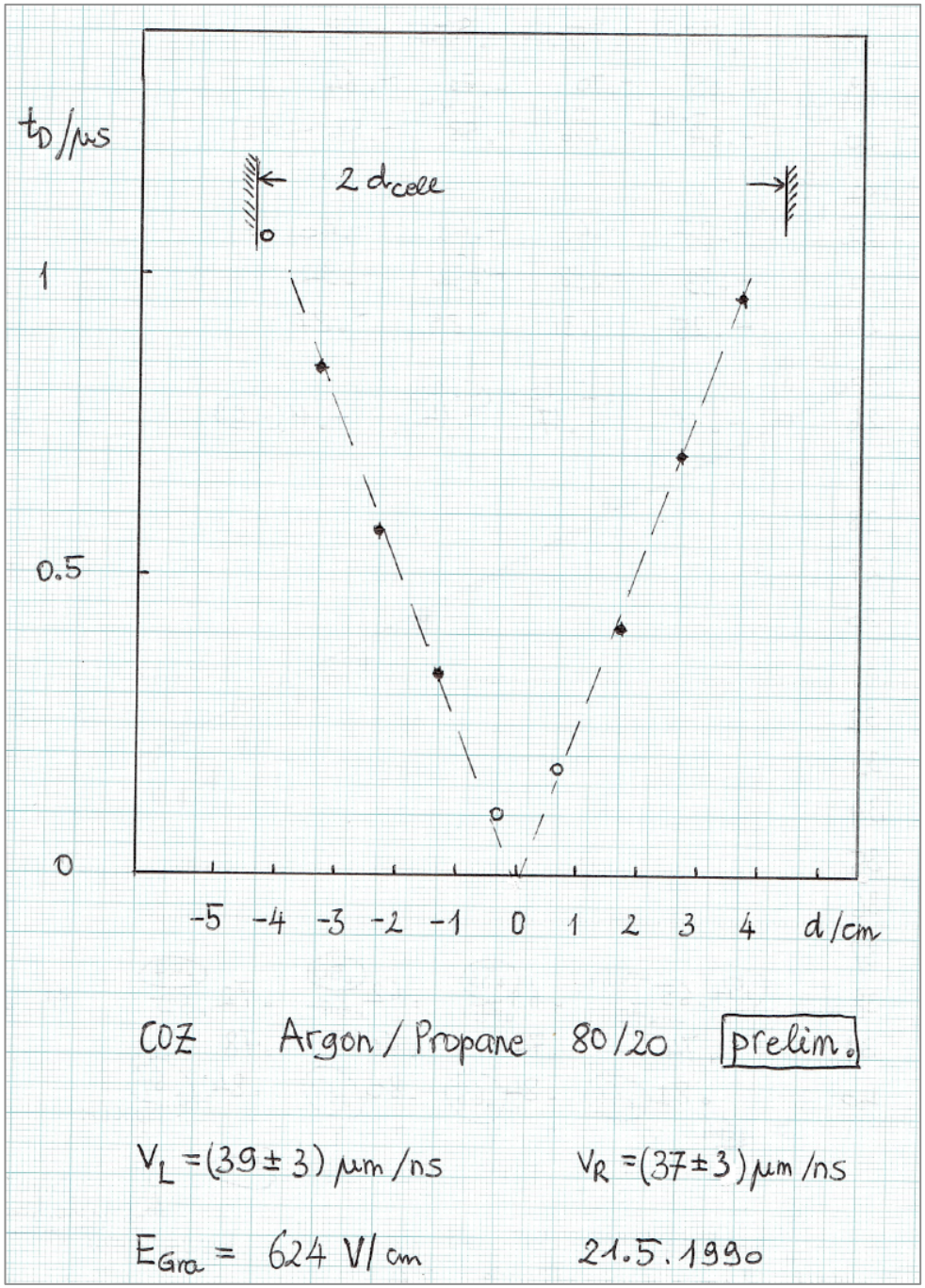
Slide from Epipany January 2015

CERN: LHC+FCC: the only realistic opportunity for energy frontier deep inelastic scattering
Huge step in energy (Q^2,1/x) and 2-3 orders of magnitude higher luminosity than HERA

Sincere thanks to all of H1 – for many of us a lifetime experience of lasting value

backup

H1 in 1990


t_D/µs
1
0.5
0
2 d_{cell}
-5 -4 -3 -2 -1 0 1 2 3 4 d/cm
COZ Argon / Propane 80/20 prelim.
V_L = (39 ± 3) µm/ns
V_R = (37 ± 3) µm/ns
E_{Gra} = 624 V/cm
21.5.1990