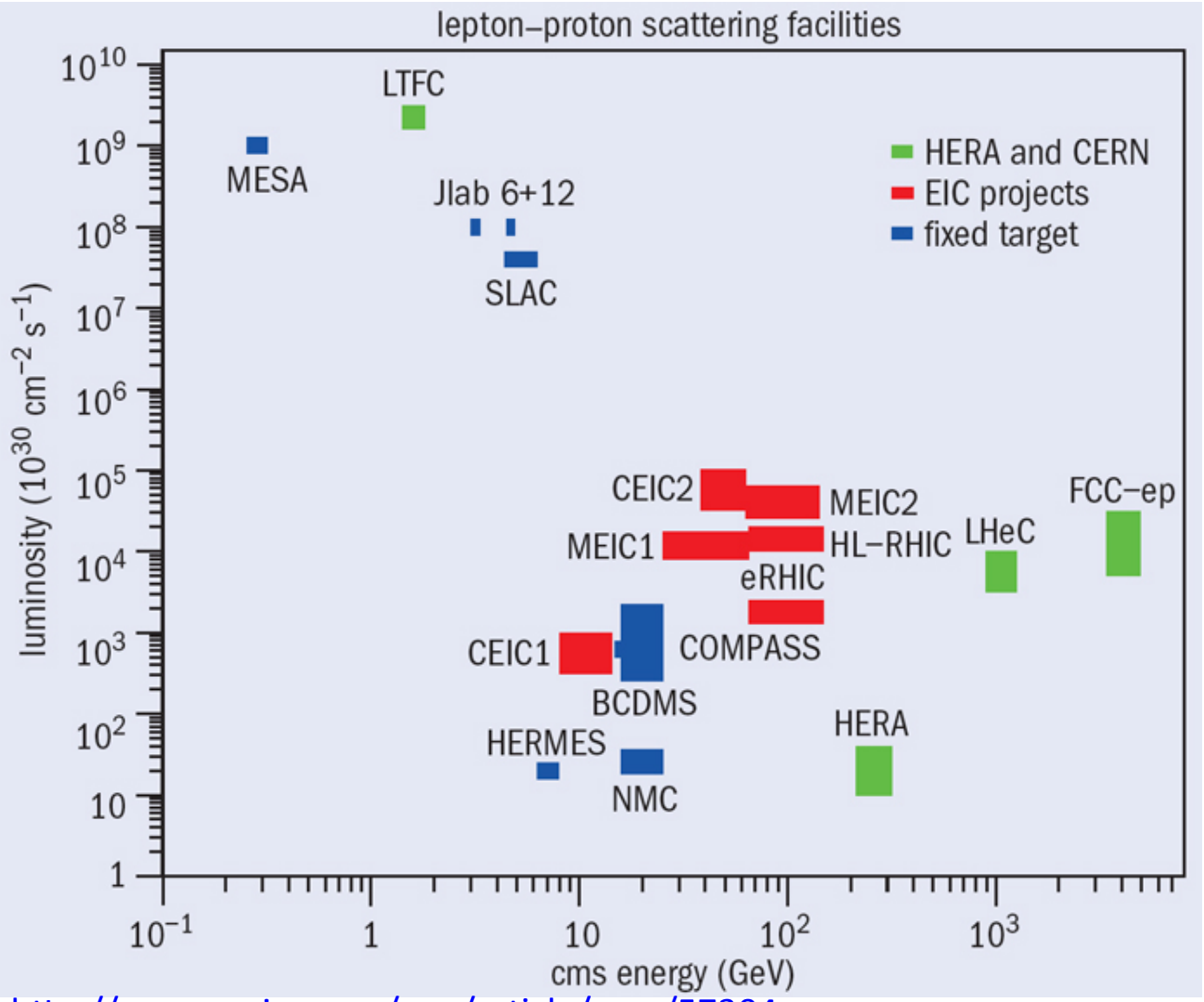
The Landscape : Luminosity vs √s



http://cerncourier.com/cws/article/cern/57304

China

CEIC1 = Chinese version of Electron-Ion Collider

("A dilution-free mini-COMPASS")

U.S.

MEIC1 = **EIC**@Jlab

eRHIC = **EIC**@BNL

Europe

LHeC = ep/eA collider @ CERN

CEIC2
MEIC2
HL-eRHIC
FCC-he

} future extensions

Future Lepton-Ion Colliders : Synergies and Complementarity

- Physics : Spin Puzzle, proton and nuclear structure, new QCD phenomena

- Machine considerations : energy recovery LINAC's, luminosity
- Beam polarisations : sources and measurements
- General purpose collider-physics detectors
- Status of projects and expected timelines

Main physics goals of new DIS Colliders*)

Slide from M. Klein @ Epiphany Conference Cracow, 10.1.2015

Substructure of nucleons
Development of QCD, Discoveries
Structure of γ, Pomeron, n, D, A..
Precision eweak measurements ..

Low energy (smaller HERA)

Nuclear structure
Electroweak below Z
p Spin composition
Spin structure
"Proton Holography 3d" …

High Energy (bigger HERA)

Unfolding of *all* partons (NC+CC)
New physics (Higgs, DM, RPV SUSY, LQs..)
Electroweak below and beyond Z
Non linear QCD in ep and eA (QGP)
Top physics …

Why are quarks and leptons different?
Salam 1976

FCC-he: 10 times higher H-HH cross section
10 times lower x
4 times larger mass range for NP ..
as compared to LHeC
but the FCC is later + more expensive.

*) incomplete