

Future Lepton-Hadron and Photon-Hadron Colliders

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"Short" term future (2010-2015)

1. LEP*LHC

ep: $E_e=67.3\text{GeV}$, $E_p=7\text{TeV}$, $E_{\text{cm}}=1.37\text{TeV}$, $L_{\text{int}}=1.2\text{fb}^{-1}$

eA: $E_A=Z \cdot E_p$, $L_{\text{int}}(\text{e-Pb})=0.1\text{pb}^{-1}$

2. THERA:

ep: $E_e=500\text{GeV}$, $E_p=0.92\text{TeV}$, $E_{\text{cm}}=1.35\text{TeV}$, $L_{\text{int}}=0.1\text{fb}^{-1}$

eA: $E_A=Z \cdot E_p$, $L_{\text{int}}(\text{e-C})=1\text{pb}^{-1}$

γ p: $E_\gamma \approx 400\text{GeV}$, $E_{\text{cm}} \approx 1.2\text{TeV}$, $L_{\text{int}}=0.1\text{fb}^{-1}$

γ A: $E_A=Z \cdot E_p$, $L_{\text{int}}(\gamma\text{-C})=1\text{pb}^{-1}$

also: FEL γ A

e and γ on the polarized fixed target

3. μ p Tevatron

$E_\mu=200\text{GeV}$, $E_p=1\text{TeV}$, $E_{\text{cm}}=0.89\text{TeV}$, $L_{\text{int}}=0.1\text{fb}^{-1}$

"Middle" term future (2015-2020)

1. Linac*LHC

ep: $E_e=1\text{TeV}$, $E_p=7\text{TeV}$, $E_{\text{cm}}=5.29\text{TeV}$, $L_{\text{int}}=(1\div 10)\text{fb}^{-1}$

eA: $E_A=Z\cdot E_p$, $L_{\text{int}}(\text{e-C})=(10\div 100)\text{pb}^{-1}$

γp : $E_\gamma\approx 0.8\text{TeV}$, $E_{\text{cm}}\approx 4.73\text{TeV}$, $L_{\text{int}}=(1+10)\text{fb}^{-1}$

γA : $E_A=Z\cdot E_p$, $L_{\text{int}}(\gamma\text{-C})=(10+100)\text{pb}^{-1}$

2. $\sqrt{s}=3\text{TeV}$ μp

$E_\mu=1.5\text{TeV}$, $E_p=1.5\text{TeV}$, $E_{\text{cm}}=3\text{TeV}$, $L_{\text{int}}=(1\div 10)\text{fb}^{-1}$

3. CLIC based

ep: $E_e=2.5\text{TeV}$, $E_p=2.5\text{TeV}$, $E_{\text{cm}}=5\text{TeV}$, $L_{\text{int}}=(1\div 10)\text{fb}^{-1}$

eA: $E_A=Z\cdot E_p$, $L_{\text{int}}(\text{e-C})=(10\div 100)\text{pb}^{-1}$

γp : $E_\gamma\approx 2\text{TeV}$, $E_{\text{cm}}\approx 4.47\text{TeV}$, $L_{\text{int}}=(1+10)\text{fb}^{-1}$

γA : $E_A=Z\cdot E_p$, $L_{\text{int}}(\gamma\text{-C})=(10+100)\text{pb}^{-1}$

**"Long" term future (>2020): e-ring*VLHC with $\sqrt{s}=7\text{TeV}$;
LSC*Eloisatron with $\sqrt{s}=63.2\text{TeV}$, $\sqrt{s}=100\text{TeV}$ μp**

**For details, see review: S. Sultansoy "The post-HERA era:..."
DESY-99-159 (1999)**