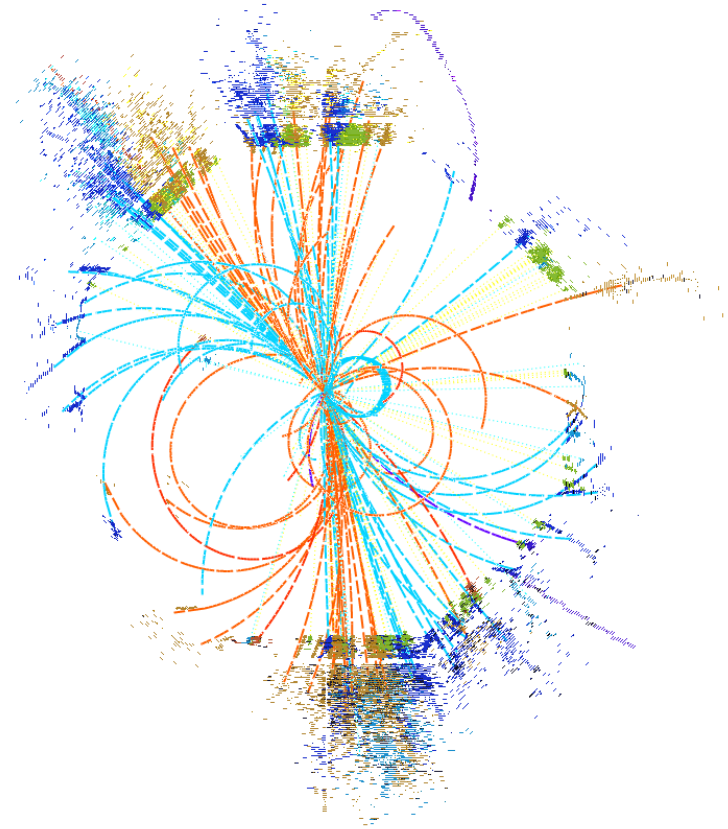


Open issues



Philipp Roloff (CERN)

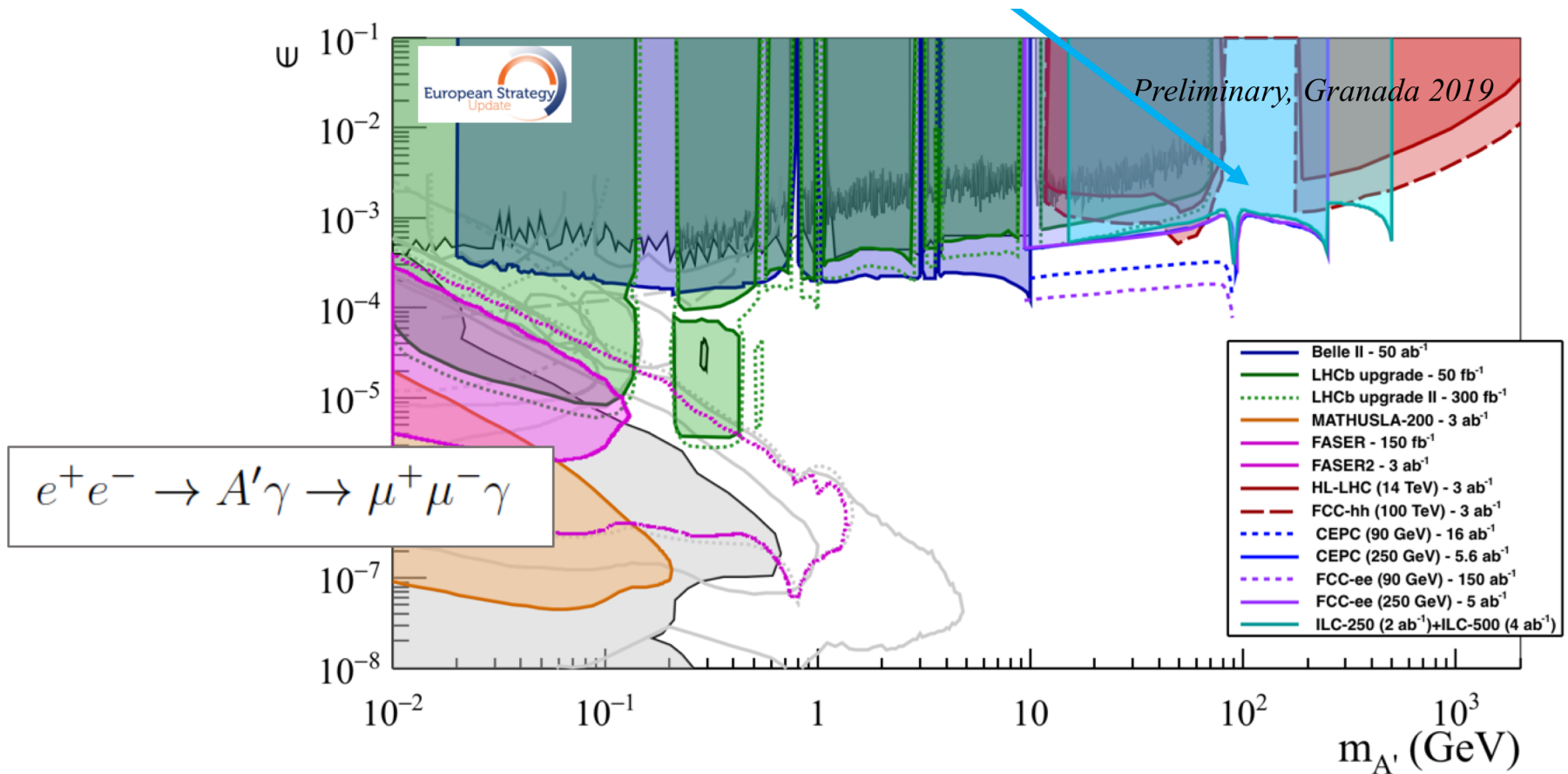
CLICdp
WG Analysis Meeting



23/05/2019
CERN, Geneva



Dark photons



Should be studied for 380 GeV CLIC

Gaia Lanfranchi, Granada symposium

EWPO from LEP / SLD in EFT fit

Observable	Experimental value	Ref.	SM prediction	Definition
m_Z [GeV]	91.1875 ± 0.0021	[27]	\times	$\sqrt{\frac{(g_L^2 + g_Y^2)v^2}{4}} + \delta\Pi_{ZZ}(m_Z^2)$
Γ_Z [GeV]	2.4952 ± 0.0023	[27]	2.4950	$\sum_f \Gamma(Z \rightarrow ff)$
σ_{had} [nb]	41.540 ± 0.037	[27]	41.484	$\frac{12\pi}{m_Z^2} \frac{\Gamma(Z \rightarrow e^+e^-)\Gamma(Z \rightarrow q\bar{q})}{\Gamma_Z^2}$
R_ℓ	20.767 ± 0.025	[27]	20.743	$\frac{\sum_q \Gamma(Z \rightarrow q\bar{q})}{\Gamma(Z \rightarrow \ell^+\ell^-)}$
A_ℓ	0.1499 ± 0.0018	[28]	0.1472	$\frac{\Gamma(Z \rightarrow e_L^+e_L^-) - \Gamma(Z \rightarrow e_R^+e_R^-)}{\Gamma(Z \rightarrow e^+e^-)}$
$A_{\text{FB}}^{0,\ell}$	0.0171 ± 0.0010	[27]	0.01626	$\frac{3}{4} A_\ell^2$
R_b	0.21629 ± 0.00066	[27]	0.21578	$\frac{\Gamma(Z \rightarrow d\bar{d})}{\sum_q \Gamma(Z \rightarrow q\bar{q})}$
A_b	0.923 ± 0.020	[27]	0.93463	$\frac{\Gamma(Z \rightarrow d_L d_L) - \Gamma(Z \rightarrow d_R d_R)}{\Gamma(Z \rightarrow d\bar{d})}$
A_b^{FB}	0.0992 ± 0.0016	[27]	0.1032	$\frac{3}{4} A_\ell A_b$
R_c	0.1721 ± 0.0030	[27]	0.17226	$\frac{\Gamma(Z \rightarrow u\bar{u})}{\sum_q \Gamma(Z \rightarrow q\bar{q})}$
A_c	0.670 ± 0.027	[27]	0.668	$\frac{\Gamma(Z \rightarrow u_L \bar{u}_L) - \Gamma(Z \rightarrow u_R \bar{u}_R)}{\Gamma(Z \rightarrow u\bar{u})}$
A_c^{FB}	0.0707 ± 0.0035	[27]	0.0738	$\frac{3}{4} A_\ell A_c$
m_W [GeV]	80.385 ± 0.015	[29]	80.364	$\sqrt{\frac{g_L^2 v^2}{4}} + \delta\Pi_{WW}(m_W^2)$
Γ_W [GeV]	2.085 ± 0.042	[30]	2.091	$\sum_f \Gamma(W \rightarrow ff')$
$\text{Br}(W \rightarrow \text{had})$	0.6741 ± 0.0027	[31]	0.6751	$\frac{\sum_q \Gamma(W \rightarrow qq')}{\sum_f \Gamma(W \rightarrow ff')}$

Z pole

WW production

NB: The ECFA Higgs@FutureColliders group does not assume lepton universality

arXiv:1411.0669

EWPO at CLIC

- **CLIC energy stage at 91 GeV?**: clarifying parameters (luminosity, polarisation) with accelerator experts, then estimates based on LEP / SLD / Giga-Z numbers?
- **Return-to-Z events at 380 GeV**:
generator-level / Delphes studies needed
- **W properties**: m_W with a few MeV precision at 380 GeV seems feasible ([arxiv:1310.6708](https://arxiv.org/abs/1310.6708)), need estimate for $\text{BR}(W \rightarrow \text{had.})$ and $\text{BR}(W \rightarrow e\nu / \mu\nu / \tau\nu)$

→ **volunteers welcome**