TLEP & CEPC

Electroweak Precision Data: oblique parameters

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ongoing analysis with

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Hypothetical Data

	current	CEPC	TLEP	low-energy
M_Z	± 2.1	± 0.6	± 0.1	
Γ_Z	± 2.3	± 0.6	± 0.1	
σ_{had}	± 0.037	± 0.01	± 0.01	
R_b	± 0.024	± 0.0007	± 0.0015	
R_l	± 0.00066	± 0.00018	± 0.00006	
$A_{FB}^{0,b}$	± 0.0022		$\pm 2 \times 10^{-5}$	
M_W	± 15	± 3	± 0.6	
$A_{FB}^{0,l}$	± 0.0016	± 0.00015		
m_{top}	± 950		± 16	
$\Delta\alpha_{had}^{(5)}(M_Z)$	$\pm 7.8 \times 10^{-5}$			$\pm 4 \times 10^{-5}$
m_{top}	± 30			± 3
m_{top}	± 29			± 4
α_s				± 0.0001

General (random) remarks

- oblique approximation in most cases not applicable, but serves as benchmark.
- σ_{had}: will assume moderate factor 2 improvement in theoretical small-angle Bhabba X-section
- even moderate factor 4 over LEP would reduce uncertainty in N_ν by factor 4 (STU fit)
- within SM: CEPC/TLEP can measure $\alpha_s(M_Z)$ to 0.1%
- theory uncertainties: TLEP (and to a lesser extent CEPC) useful only when EW corrections are pushed by an extra order
- $\Delta\alpha_{had}$ (3-flavor) + m_c, m_b, α_s instead of $\Delta\alpha_{had}$ (5-flavor)
- consider polarization option at CEPC and TLEP for specific observables
- indirect Z' from Z pole? from X-sections and asymmetries at higher s?
- complementary efforts: Qweak & MOLLER (JLab) and P2 (Mainz)

STU

	current	CEPC	CEPC + α m	CEPC + m m	TLEP	TLEP + α m
S	± 0.101	± 0.025	± 0.023	± 0.023	± 0.012	± 0.006
T	± 0.117	± 0.032	± 0.031	± 0.030	± 0.008	± 0.006
U	± 0.096	± 0.024	± 0.023	± 0.023	± 0.007	± 0.005
S	± 0.081	± 0.018	± 0.014	± 0.013 (10)	± 0.012	± 0.005
T	± 0.068	± 0.019	± 0.017	± 0.013 (6)	± 0.004	± 0.003
T	± 0.030	± 0.014	± 0.010	± 0.006	± 0.002	± 0.002