alphas-2027: Workshop on precision measurements of the QCD coupling constant

10 May 2027 - 14 May 2027

ECT* Trento

Scientific Programme

The strong coupling constant α_S is the least well known of all constants of nature, which play a role in the Standard Model (SM) of particle physics and related fields such as cosmology and astrophysics. For many searches for new physics beyond the SM as well as for some important precision tests of the SM using collider data the uncertainty on the value of α_S is a limiting factor. In recent years progress in theoretical predictions of Quantum Chromodynamics (QCD), and the availability of collider data at the highest energies has led to many improved determinations of α_S. The current world average quotes an uncertainty of less than 1%. However, there are noticeable discrepancies between different categories of determinations of α_S, which may limit the ultimate precision of future world averages. We plan to bring together in this workshop the leading experts on determinations of α_S from theory and experiment and all important categories. With presentations of the latest results and intense discussion by all participants we will focus on a global view of advantages and problems of each method.

All talks will be plenary and of the same length (20' + 10' questions) with ample time for discussion. The topics to discuss include:

- Current status of the α_S world average
- Impact of α_S on precision and BSM physics, and beyond
- Lattice QCD results
- α_S from hadronic tau decays and low-energy e^+e^-
- α_S from quarkonia properties
- α_S from e-p deep inelastic scattering
- α_S from e^+e^- hadronic final states
- α_S from electroweak observables
- α_S from pp collisions
- New α_S extraction approaches
- PDG approach to α_S world average and uncertainty estimation
- A preliminary new average (?) and future of α_S