

Strong coupling from a nonperturbative determination of the QCD Λ -parameter

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We present a first-principle determination of the Λ parameter and the strong coupling at the Z pole mass. Computing the nonperturbative running of the coupling in the range from 200 MeV to 70 GeV, and using experimental input values for the masses and decay constants of the pion and the kaon, we obtain $\alpha(m_Z)=0.11852(84)$. The nonperturbative running up to very high energies guarantees that systematic effects associated with perturbation theory are well under control.

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