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## Determination of $\alpha_S$ beyond $NNLO$ using the event shape averages

*Monday 12 July 2021 20:06 (2 minutes)*

We consider a method for determining the QCD strong coupling constant using fits of perturbative predictions for event shape averages to data collected at the LEP, PETRA, PEP and TRISTAN colliders. To obtain highest accuracy predictions we use a combination of perturbative  $calO(\alpha_S^3)$  calculations and estimations of the  $calO(\alpha_S^4)$  perturbative coefficients from data. We account for non-perturbative effects using modern Monte Carlo event generators and analytic hadronization models. The obtained results show that the total precision of the  $\alpha_S$  determination cannot be improved significantly with the higher order perturbative QCD corrections alone, but primarily requires a deeper understanding of the non-perturbative effects.

### Preferred track

Jets & QCD at High Scales

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