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Accurate Computations of Cavity Frequencies from time domain VORPAL simulations[1] TRAVIS AUSTIN, SERGUEI OVTCHINNIKOV, JOHN CARY, Tech-X Corp., LEO BELLANTONI, FNAL — We have applied the Werner-Cary method (J. Comp. Phys. 227, 5200-5214 (2008)) for extracting modes and mode frequencies from time-domain simulations of crab cavities, as are needed for the ILC and the beam delivery system of the LHC. This method for frequency extraction relies on a small number of simulations and post-processing using the SVD algorithm with Tikhonov regularization. The time domain simulations were carried out using the VORPAL computational framework. Comparisons with measurements of the A15 cavity show that this method can provide accuracy to within 0.01% of experimental results after accounting for manufacturing imperfections. This method has applications across many areas including obtaining MHD spectra from time-domain simulations.

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