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Bayesian modelling of JET high resolution Thomson scattering system using the Minerva framework SEHYUN KWAK, Korea Adv Inst of Sci Tech, JAKOB SVENSSON, SERGEY BOZHENKOV, Max-Planck-Institut fr Plasmaphysik, JOANNE FLANAGAN, MARK KEMPENAARS, Culham Centre for Fusion Energy, YOUNG-CHUL GHIM, Korea Adv Inst of Sci Tech, JET CONTRIBUTORS COLLABORATION — A Bayesian model for JET high resolution Thomson scattering (HRTS) system has been developed to infer electron temperature and density profiles. The model has been implemented in the Minerva framework. The HRTS system detects Thomson scattered photons from the injected ˜20 ns long laser pulse penetrating along the midplane of the JET at 63 spatial points on the low field side (R = 2.9 ˜3.9 m) with 1˜1.6 cm spatial resolution and 20 Hz repetition rate. The Selden-Matoba Thomson scattering model infers scattered and stray light intensities as well as associated uncertainties taking into account of photon statistics and electrical fluctuations. The Markov Chain Monte Carlo (MCMC) method explores the posterior distribution of the electron temperature and density profiles which explain both HRTS and the interferometry data simultaneously within their uncertainties. The electron temperature and density profiles are modelled via Gaussian processes mapped onto normalised flux coordinates. The electron density profiles are automatically calibrated through the inclusion of interferometers in the model.

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