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14.3 A support vector regression method for efficiently determining neutral profiles from LIF data

Thursday, 19 April 2018 10:30 (120)

A support vector regression (SVR) method is integrated with a collisional radiative (CR) model of the dualsource Helicon-Cathode (HelCat) linear plasma device to determine ArI profiles based on metastable-pumped LIF measurements. A machine learning approach to the CR model allows for an efficient exploration of the input parameter space and can incorporate probe measurement errors for inputs of electron density and temperature profiles that the CR model would normally be sensitive to. A training set is created for mapping ArI input profiles to metastable CR model outputs using shape preserving cubic Hermite interpolating polynomials. This method may be easily adapted to other LIF pumping schemes and may even be used to validate electron temperature and density plasma profiles if neutral or ion profiles are already known.

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