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Tomographic reconstruction of tokamak plasma light emission using wavelet-vaguelette decomposition KAI SCHNEIDER, M2P2-CNRS & CMI Aix-Marseille University, Marseille, France, ROMAIN NGUYEN VAN YEN, Institut fuer Mathematik, Freie Universitaet Berlin, Berlin, Germany, NICOLAS FEDORCZAK, UCSD Jacobs School of Engineering, La Jolla, CA, USA, FREDERIC BROCHARD, GERARD BONHOMME, Institut Jean Lamour-CNRS, Nancy University, Vandoeuvre-les-Nancy, France, MARIE FARGE, LMD-CNRS-IPSL, Ecole Normale Superieure, Paris, France, PASCALE MONIER-GARBET, IRFM, CEA Cadarache, St Paul-lez-Durance, France — Images acquired by cameras installed in tokamaks are difficult to interpret because the three-dimensional structure of the plasma is flattened in a non-trivial way. Nevertheless, taking advantage of the slow variation of the fluctuations along magnetic field lines, the optical transformation may be approximated by a generalized Abel transform, for which we proposed in Nguyen van yen et al., Nucl. Fus., 52 (2012) 013005, an inversion technique based on the wavelet-vaguelette decomposition. After validation of the new method using an academic test case and numerical data obtained with the Tokam 2D code, we present an application to an experimental movie obtained in the tokamak Tore Supra. A comparison with a classical regularization technique for ill-posed inverse problems, the singular value decomposition, allows us to assess the efficiency. The superiority of the wavelet-vaguelette technique is reflected in preserving local features, such as blobs and fronts, in the denoised emissivity map.

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