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Image analysis of dc plasma torch using Singular Value Decomposition technique[1] VIDHI GOYAL, G RAVI, Inst for Plasm Res — In a recent work using fast imaging diagnostics on a magnetized dc non-transferred plasma torch, it was revealed that plasma column consists of different parts, each governed by a different set of forces, rendering the overall physical processes very complex. The end-on imaging clearly showed the formation of fully three dimensional structures and complex arc root motion. However, standard image analysis using conventional techniques could provide only macroscopic information on the arc root dynamics such as rotation and shunting. Singular Value Decomposition (SVD) is a powerful technique to extract fundamental features of a physical process and has been widely used in laser produced plasmas, tokamaks etc. In the present work, SVD technique has been applied on datasets derived from fast images of the plasma torch. Using this technique, dynamics of each segment of the column have been unraveled for various experimental conditions viz. gas flow rates, currents and magnetic fields. Detailed results will be presented and discussed.

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