

Abstract Submitted  
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**Comparison of techniques for determining structure velocities in Gas-Puff Imaging data**<sup>1</sup> J.M. SIERCHIO, A.E. WHITE, J.L. TERRY, MIT PSFC, I. CZIEGLER, USCD, S.J. ZWEBEN, PPPL — The Gas Puff Imaging (GPI) diagnostic on Alcator C-Mod has been used previously in numerous studies involving code validation, GAMS and zonal flows, and turbulent blob dynamics. Different methods of analyzing GPI data for turbulent structure velocities are presented, including Fourier analysis, time delay estimation, and pattern tracking. Representative implementations of these methods are explained and their results are compared on the same GPI data to reveal both agreements and discrepancies in measured velocities. We have developed a code for producing synthetic sequences of images that mimic features of the actual GPI images but move the images' structures at known velocities. This allows quantitative tests of the analysis methods and reveals their strengths and weaknesses. We have found that the methods agree when the structures move in the same direction with little dispersion but disagree when there is significant dispersion or structures appearing to move in opposite directions. Comments on the appropriate use of each of method, as well as some important physics involving multi-scale/field dispersion, will be explained.

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