Error Reduction in Molecular Tagging Velocimetry (MTV) Processing Using Image Filtering[1] MICHAEL CASO, DOUGLAS BOHL, Clarkson University — Prior work has shown that the error level in MTV measurements is closely tied to the image SN level. In practice the SN ratio will depend on experimental conditions such as attenuation, Field of View, laser power, camera, etc.; however, there is a minimum SN level that can be achieved for any given experiment. Experience has shown that MTV images typically have a SN=2-8. It is therefore desirable to be able to lower image noise after the images are acquired to reduce measurement error. In this work post processing MTV images using image filtering schemes such as Gaussian Blur, FFT (band pass), median filtering etc. was investigated using synthetic MTV images with added random noise. The synthetic images were filtered and then processed using a direct correlation technique. The results showed that for very noisy images (i.e. SN<4) the all filtering techniques improved the displacement error by 10-40%. As the SN increased filtering because less effective in decreasing error and in some cases increased the measurement error. The FFT band pass filter was most effective and improved measurement error for all SN levels.

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