

Abstract Submitted  
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**Use of a moving diffraction grating to challenge our understanding of velocimetry data** MATTHEW BRIGGS, HEATHER ANDREWS, STEVEN HARE, LAWRENCE HULL, MICAH JAKULEWICZ, MICHAEL SHINAS, Los Alamos National Laboratory — It has now been well established that optical-interference velocimetry will not detect the approach of material arising from the lateral motion of a tilted surface. The usual explanation is that in order to receive light from a tilted surface, the light must travel in a non-specular direction, and so the surface must be rough compared to the wavelength of light. The lateral motion of this rough surface scrambles the phase of the return signal, preventing the interferometry from reporting a signal. We report on experiments that use level and tilted diffraction gratings moving laterally to the velocimetry beam to try to circumvent this: the surface is smooth compared to the wavelength on short scales, but the diffraction maxima allow us receive light in a non-specular direction. Initial results show that this will present a challenge to our understanding of velocimetry measurements. for unlimited release LA-UR-15-20636.

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