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Comparing simulations and multi-point observations at the quasi-perpendicular bow shock

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High Mach number collisionless quasi-perpendicular shocks are, to a large extent, governed by the effects of multi-scale coupling. Reflected ions are required for dissipation, and they impose a characteristic scale. But other scales, both larger and smaller, affect how ions are reflected and thermalized. In studying this cross-coupled system multi-point observations are limited by fixed separations and only short residency times within the shock transition. Interpreting substructure and variability depends on the combined effects of relative scale lengths and rates of change within the shock transition, as well as the time spent within the shock. The effect of shock crossing speed is investigated using comparisons of two-dimensional hybrid simulations and Cluster observations. In the simulations, as the crossing speed decreases more structure becomes visible in time series, and major differences are seen even between closely separated probes. The difficulties and advantages of using simulations to interpret observations will be discussed, particularly in the context of low speed shock crossings, also whether such features as shock ripples, reformation and whistler turbulence can be interpreted unambiguously.