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## First clear particle observations of earth's bow shock potential

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Many fundamental questions about collisionless shocks remain unanswered. One of the most important is the structure of the electric potential across shocks predicted by simulation models. This talk will present the first particle observations from Double Star of a nearly perpendicular shock that show H+ and He++ each losing equal amounts of energy per charge as the solar wind traverses the shock. This is an unambiguous signature of deceleration caused by a charge separation electric field. This shock was accompanied by solar wind Maxwellian electron distributions throughout the shock ramp, but with significant heating. This is different from the "flattop" electron distributions commonly reported. Heating and flow energy gained by electrons can account for only 20% expected from the electric potential deduced from ion observations, suggesting that electrons take a path different from the ions across the shock potential and lose energy to the solar wind electric field. Subsequent talks by Wilber et al. and Lee et. el. will discuss transmitted and reflected populations including test particle simulation results.