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Effects of trapped electrons on ion reflection in an oblique shock wave MIEKO TOIDA, National Institute for Fusion Science, JUNYA INAGAKI, Nagoya University — A magnetosonic shock wave propagating obliquely to the external magnetic field can trap some electrons and accelerate them to ultrarelativistic energies [1]. These electrons significantly influence electromagnetic fields near the shock front. In the 2D simulation, the trapped electrons excite whistler-wave instabilities. As a result of nonlinear development of the instabilities, 2D electromagnetic fluctuations along the shock front grow to large amplitudes [2]. We studied effects of trapped electrons on ion motions in an oblique shock wave [3]. We analytically derived the condition for ions to be reflected from the shock front. It was predicted that the fraction of reflected ions is enhanced by the 2D electromagnetic fluctuations excited by trapped electrons. This prediction was confirmed by 2D electromagnetic particle simulations with full ion and electron dynamics and calculation of test ions in the electromagnetic fields averaged along the shock front. A comparison between 2D and 1D electromagnetic particle simulations is also shown.

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