Plasma and magnetic field parameters at bow shocks of short period extrasolar gas giants

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We present a method to model the plasma environment of the short periodic Jovian-like exoplanets HD 209458 b and OGLE-TR-56 b orbiting their host stars at distances of 0.045 AU and 0.023 AU imbedded in a dense stellar wind. Further, recent astrophysical observations indicate that the stellar wind of young stars is much denser and faster than in the case of older stars like the present Sun. Therefore, we model both cases of the stellar evolution, namely an early stage of 0.5 Gyr and a present Sun scenario of 4.6 Gyr, respectively. For the sake of simplicity we use the isotropic set of MHD equations to obtain the plasma and field variations across the bow shock for different shock geometries. We find that high sonic and Alfvénic Mach numbers correspond to stronger variations across the discontinuity. Moreover we compare the results with those of Jupiter at its present orbit at 5 AU.