

Abstract Submitted  
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**Doppler Broadening induced by fast heavy particles in molecular hydrogen**<sup>1</sup> ZORAN PETROVIC, VLADIMIR STOJANOVIC, ZELJKA NIKITOVIC, Institute of physics, Pregrevice 118, POB 68, 11000 Belgrade — We study anisotropy of anomalously broadened H-alpha line in a low current Townsend discharge in hydrogen. Monte Carlo simulation based on the best available collision data was used to predict kinetic energies of excited atoms including their angular distribution which results in the anisotropy of the broadened wings. Monte Carlo simulations included elastic, inelastic, and reactive collisions of electrons, energetic hydrogen ions, atoms and molecules [A.V. Phelps, Phys. Rev. E **79**, 066401 (2009)]. We obtained the H-alpha profiles with far wings mainly both in direction of the field (end on) and as observed at 90° to the field (side on). In order to observe the effect of heavy particles we subtract the electron induced contribution to the profiles. Very large degree of anisotropy exists in the far wings. The “end on” profiles due to the fast neutrals are quite asymmetric. “Side” on profiles are symmetric with a large central peak due to all the fast particles aligned with the electric field, and the broad wings due to scattered fast neutrals gaining some perpendicular momentum. The wide wing component grows rapidly towards the cathode.

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