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Charge-Current Output in Plasma-Immersed Hydrogen Atom with Noncentral Interaction

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Abstract

A theoretical investigation on the charge-currents and induced magnetizations of hydrogen atoms with noncentral interaction, immersed in a plasma environment, under the influence of spherical encompassing is performed. The Hartmann potential for noncentral interaction is considered, but it is modified due to the plasma-embedded hydrogen atom. The interactions in plasma are delineated by keeping in view the more general exponential cosine screened Coulomb (MGECSC) potential which reproduces more general and detailed outcomes. The shielding effect of the plasma environment is regarded by modifying the Hartmann potential through the MGECSC potential. Thus, the hydrogen atom is considered to be under the influence of the plasma modified Hartmann (PMH) potential. While the numerical tridiagonal matrix method (TMM) is employed due to the difficulty of analytical solution to the radial wave equation in nonrelativistic scheme including PMH potential, a hybrid solution technique is preferred by using asymptotic iteration method (AIM) to solve the angular wave equation. This study provides a detailed analysis of the plasma shielding, spherical confinement, and noncentral effect on the production and control of

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charge-currents and induced magnetizations. In this analysis, the alternativeness to each other of the plasma environment, spherical encompassing, and noncentral effect is also evaluated, and suggestions are made for related application studies.

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Keywords Plus: [PARTICLE](#); [MOTION](#)

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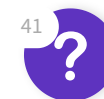
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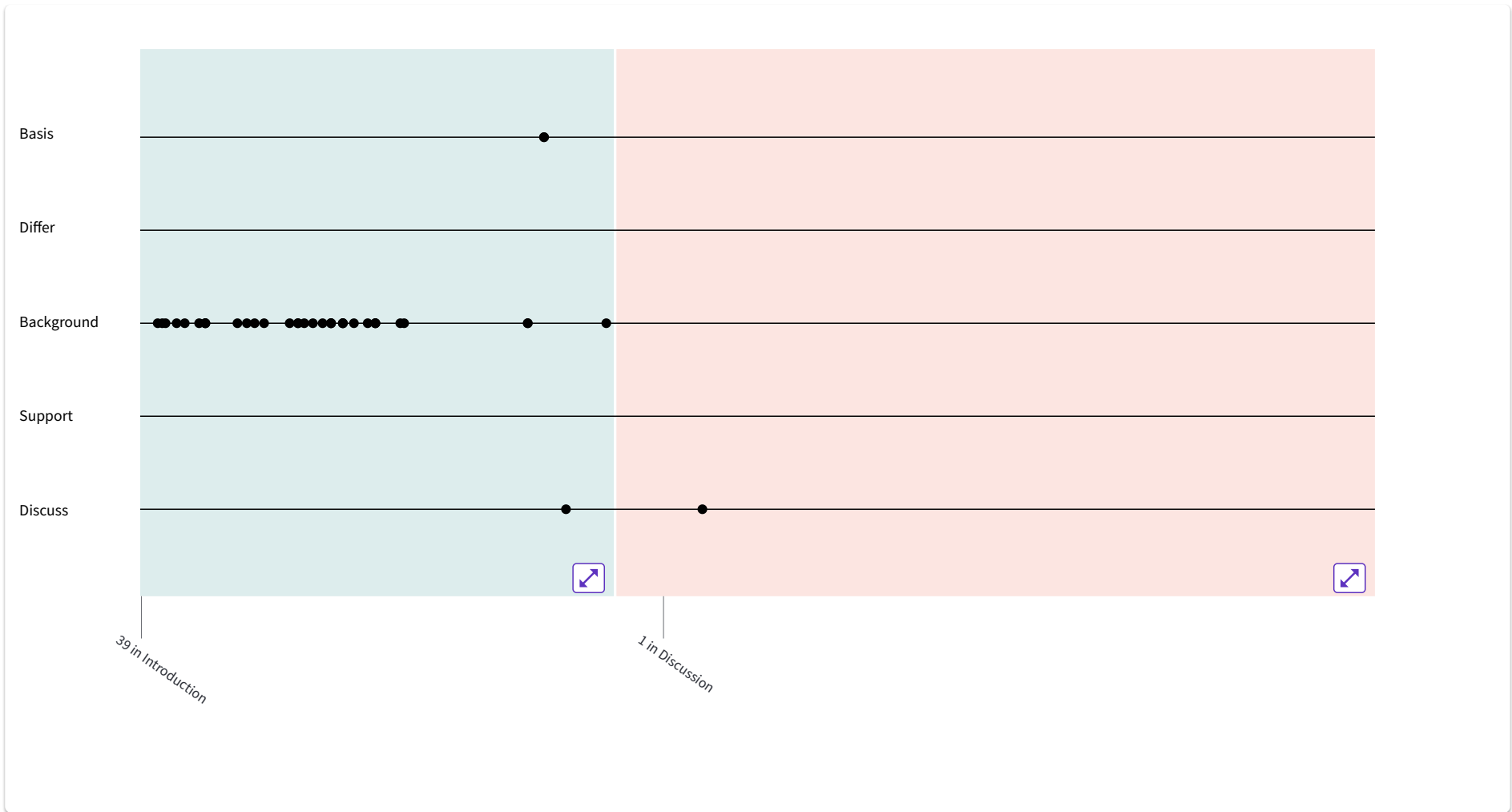
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