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Very Significant Revision Required for Electron Densities in White Dwarfs Deduced from Widths of Hydrogen Spectral Lines

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In strongly magnetized plasmas of DA white dwarfs, where the magnetic field B could be as high as ~ (10^2 – 10^5) Tesla, electrons move along strongly helical trajectories. The allowance for helical trajectories of plasma electrons dramatically changes the Stark width of hydrogen spectral lines compared to all previous calculations. We show analytically that without allowance for this effect, the electron densities deduced from all previous and future observations of hydrogen lines in DA white dwarfs can be erroneous by up to one order of magnitude. Thus, a very significant revision of electron densities deduced from all observations of hydrogen lines in DA white dwarfs, is required.

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