Magnetic White Dwarfs Recreated in HEDP Laboratory Settings

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Fitting spectral lines of white dwarfs (WD) to model atmospheres is the most common way to determine fundamental properties of temperature and surface gravity. However, this becomes more difficult in the presence of magnetic fields, which split and can even shift the lines with increasing field strength. About one-fourth of all WDs are impacted by this Zeeman effect, hosting magnetic fields that range from kilogauss up to gigagauss strengths. Magnetic WDs also have statistically higher masses than their non-magnetic counterparts, giving additional importance to understanding how WD atmosphere conditions behave in magnetic fields. The altered spectral lines are treated with the robust theory developed for all different field strength regimes of the Zeeman effect. However, all good theory should be backed by experimentation. As of 2022, there have been no dedicated experiments to recreate the Zeeman effect in WD conditions in a laboratory setting, but there have been magnetized HEDP experiments that fall within these conditions nonetheless. Here, I present a look into where magnetized HEDP experiments have probed the parameter space of magnetic WDs, with a focus on the spectroscopic determination of magnetic fields in the relevant WD conditions.