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Nucleosynthesis predictions and high-precision deuterium measurements

Monday 12 September 2016 14:00 (30 minutes)

I will present two new high-precision measurements of the deuterium abundance from absorbers along the line of sight to the quasar PKS1937–1009. The absorbers have lower column densities (N(HI)$\approx 18\mathrm{cm}^{-2}$) than for previous high-precision measurements, boding well for further extensions of the sample due to the plenitude of low column density absorbers. The total high-precision sample now consists of 12 measurements with a weighted average D/H = $2.55 \pm 0.03 \times 10^{-5}$. The sample does not favour a dipole similar to the one detected for the fine structure constant. The increased precision also calls for improved nucleosynthesis predictions. For that I present an updated version of the public AlterBBN code including new reactions, updated rates, and the possibility of adding new physics such as dark matter. The standard Big Bang Nucleosynthesis prediction of D/H = $2.456 \pm 0.057 \times 10^{-5}$ is consistent with the observed value within 1.7 standard deviations.

Summary

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