[SS1-5] The non force-free magnetic fields in atmospheres of chemically peculiar Ap/Bp stars: a model and observations (BOES)

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The slow evolution of Ap/Bp dipolar magnetic fields leads to the development of an induced electric current in all conductive atmospheric layers. The Lorentz force, which results from the interaction between a magnetic field and the induced current, may considerably change the atmospheric structure, produce specific variations of some spectral features, and provide insight into the formation and evolution of global stellar magnetic fields. To test this idea, we carried out spectral observations of one of the brightest magnetic chemically peculiar star Theta Aur. We found variations in the Balmer profiles which reach up to 2.5%. Using computations and theoretical predictions of our model atmospheres (Valyavin et al., 2004) we interpret the data in the frame of critical constraints to a theory of fossil stellar magnetic fields.

[SS2-1] Cosmological Simulations and Comparisons with SDSS Observations

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We have run two cosmological N-Body simulations with 20483 particles, both of which are larger than any other simulation ever performed. One simulation with 1024 h-1Mpc box size is to compare the predictions of the concordance LCDM model with SDSS observations such as distributions and internal properties of galaxies down to virial mass $6\times10^{11}h^{-1}M_{\odot}$. The other simulation with about $5.6h^{-1}$ Gpc box size is for the study of the Sunyaev-Zeldovich effect due to X-ray clusters of galaxies within the limits of optical observations ($z\sim5$). During the simulations, the past light-cone data were saved at each time step to mimic visual observations like redshift surveys.
From the outputs of simulations, we will obtain various cosmological quantities such as the genus statistics and mass function of halos to investigate the relation between the model and observations. Furthermore, dynamical interactions between cosmological objects will be measured using the spin-tidal relation.