**Understanding the Large Scale Clustering of the Lyman-alpha Forest** AGNIESZKA CIEPLAK, ANZE SLOSAR, NISHIKANTA KHANDAI, Brookhaven National Laboratory — The Lyman-alpha forest has become a powerful probe of cosmological parameters by measuring large scale structure at intermediate redshift. With upcoming surveys increasing the scope of these measurements, understanding of the bias between the measured flux and the underlying matter power spectrum is becoming crucial to the percent level cosmological interpretation of these observations. We therefore employ cosmological hydrodynamic simulations to study the response of the Lyman-alpha forest clustering to large wavelength modes of the underlying matter large-scale structure and compare these to previous theoretical studies of this bias which used only N-body and hydro-PM simulations. We demonstrate this response by evolving smaller, curved universe cosmologies, representing the same universe with different overdense patches, and we use these to study the assumption of the analytical bias formula derived by Seljak (2012). A full theoretical understanding of this bias is important to fully understand the clustering of the Lyman-alpha forest and its cosmological implications.

Agnieszka Cieplak
Brookhaven National Laboratory

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