



Contribution ID: 1441  
compétition)

Type: **Poster (Student, In Competition) / Affiche (Étudiant(e), inscrit à la**

## Monte Carlo studies of the pseudogap regime in the cuprate superconductors

*Tuesday, 14 June 2016 19:08 (2 minutes)*

We present a theory that describes the pseudogap regime of the hole-doped cuprate superconductors by incorporating the competing effects of superconducting and charge density wave orders into six-dimensional degrees of freedom on a two-dimensional lattice [Science 343, 1336 (2014)]. Using Monte Carlo simulations, we calculate the charge order correlations and diamagnetic susceptibility [PRB 90, 094515 (2014)] associated with this O(6) model. We demonstrate that the structure factors calculated using our theory agree qualitatively with recent X-ray scattering experiments on hole-doped  $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$  for a wide range of temperatures about the superconducting transition. We also study the effects of incorporating into our model interlayer coupling and disorder [PRB 92, 174505 (2015)]. In the presence of disorder, we find that our theory can reproduce experimental structure factors in the zero temperature limit.

**Primary author:** HAYWARD SIERENS, Lauren (University of Waterloo)

**Co-authors:** Dr ACHKAR, Andrew (University of Waterloo); Prof. HAWTHORN, David (University of Waterloo); Ms NIE, Laimei (Stanford University); Prof. MELKO, Roger (University of Waterloo); Prof. KIVELSON, Steven (Stanford University); Prof. SACHDEV, Subir (Harvard University)

**Presenter:** HAYWARD SIERENS, Lauren (University of Waterloo)

**Session Classification:** DCMMP Poster Session with beer / Session d'affiches, avec bière DPMCM

**Track Classification:** Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)