Abstract Submitted
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Temperature/frequency scaling of conductivity near the M-I transition in doped semiconductors ERIK HELGREN, Physics Department, University of California, Berkeley, LI ZENG, Materials Science and Engineering Program, University of California, San Diego, FRANCES HELLMAN, Physics Department, University of California, Berkeley, KENNY BURCH, Physics Department, University of California, San Diego, DIMITRI BASOV, Physics Department, University of California, San Diego — Doped semiconductors undergo a metal-insulator transition (MIT) at T = 0, i.e. a quantum phase transition and can be probed by varying the dopant concentration for a set of samples through a critical concentration. In crystalline systems such as Si:P, this occurs at a dopant concentration near 10^{18}, but in amorphous systems such as a-NbSi and a-GdSi, it occurs closer to 10-15 at.%[1,2]. Doping with Gd introduces the possibility of examining this transition with concentration as well as magnetic field tuning, as it has been shown that a magnetic field tunes a sample of a-GdSi through the MIT[3]. We present scaling results for families of DC conductivity and optical conductivity curves for both the concentration tuned as well as the magnetic field tuned MIT. Probing the same quantum critical point using two separate tuning parameters allows for a unique and separate determination of the success of dynamic scaling as a function of the tuning parameter. A comparison of the concentration tuned vs. the magnetic field tuned transition shows distinct differences. [1] Hertel et al., *Phys. Rev. Lett.* **50**, 743 (1983) [2] Hellman et al., *Phys. Rev. Lett.* **77**, 4652 (1996) [3] Teizer et al., *Phys. Rev. B* **67**, 121102(R) (2003)

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