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Study of a one-dimensional three-orbital Hubbard model and effect of spin orbit coupling using the Density Matrix Renormalization Group method. NITIN KAUSHAL, SHAOZHI LI, YAN WANG, Univ of Tennessee, Knoxville, Y TANG, Department of Physics, Virginia Tech, Blacksburg, GONZALO ALVAREZ, ALBERTO NOCERO, THOMAS MAIER, CNMS, Oak Ridge National Laboratory, STEVEN JOHNSTON, ELBIO DAGOTTO, Univ of Tennessee, Knoxville — We performed an extensive study of a three-orbital Hubbard model in one dimension using the Density Matrix Renormalization Group technique [1]. The importance of pair-hopping and spin-flip interactions was analyzed. We also calculated the orbital-resolved density of states in the ferromagnetic phase using Dynamical DMRG [2]. The presence of a charge gap was confirmed by performing finite size scaling. The effect of spin-orbit coupling (SOC) on the same model has also been studied, and the Hubbard U versus SOC strength phase diagram was constructed; this analysis was carried out considering the potential role of SOC in iridates [3] and also in iron superconductors [4]. [1] Guangkun Liu et al., Phys. Rev. E 93, 063313 (2016). [2] Shaozhi Li et al., ArXiv:1608.05297 (2016). [3] H. Okabe et al., Phys. Rev. B 83, 155118 (2011). [4] S. V. Borisenko et al., Nat. Phys. 12, 311 (2016).

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