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Orbital-Selective Mott Phase in Multiorbital Models for Alkaline Iron Selenides QIMIAO SI, RONG YU, Department of Physics and Astronomy, Rice University — The degree of electron correlations is crucial for understanding the properties of both the normal and superconducting states of the iron-based superconductors. The superconductivity near an antiferromagnetic insulating phase in the newly discovered alkaline iron selenide superconductors suggests stronger electron correlations in these materials than in iron pnictides. To investigate the correlation effects in the alkaline iron selenides, we study the metal-to-Mott-insulator transition in multiorbital models for this system using a slave-spin mean-field method [1]. We show that when the Hund's coupling is beyond a threshold, this transition is via an intermediate orbital-selective Mott phase, in which the 3d xy orbital is Mott localized while the other 3d orbitals remains itinerant. We find that this phase is still stabilized over a range of carrier dopings, and has unique experimental signatures [2,3]. Our results lead to an overall phase diagram for the alkaline iron selenides, in which the orbital-selective Mott phase provides a natural link between the alkaline iron selenide superconductor and its parent Mott-insulating compound. [1] R. Yu and Q. Si, arXiv:1208.5547. [2] M. Yi et al., arXiv:1208.5192. [3] P. Gao et al., arXiv:1209.1340.

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