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The magnetic phase diagram of iron pnictides GERMAN SAMOLYUK, JIJI PULIKKOTIL, VLADIMIR ANTROPOV, Ames Laboratory, Ames, IA, 50011 — We study the stability of magnetic structures in iron pnictides as a function of doping, external pressure and the amount of defects. Several collinear and non-collinear magnetic structures are found to be stable in all classes of pnictides. This stability however is a result of a fragile competition between several nearest neighbor exchange couplings and depends greatly on doping. We determined that for a relatively small electron doping the non-magnetic instability is developed, while already for a small hole doping the stripe structure is instable in many pnictides and other magnetic structures are stabilized. For a larger hole doping the local magnetic moment phase with ferromagnetic long range order can be stabilized. A transition to non-collinear state at small moments is explained by a competition between the anisotropy of the nearest neighbors exchange couplings and third or forth neighbor couplings. Using very extensive calculations of magnetic stability parameter we build a generic pressure-concentration phase diagram of iron pnictides.

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