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**The magnetic and nematic phase diagram of  $\text{Ba}_{1-x}\text{Sr}_x\text{Fe}_{2-y}\text{Ni}_y\text{As}_2$** <sup>1</sup> DONGLIANG GONG, SHILIANG LI, Institute of Physics, Chinese Academy of Sciences (CAS), SC8, NATIONAL LAB FOR SUPERCONDUCTIVITY, IOP, CAS TEAM — The correlation between magnetic and nematic orders has been widely studied in iron-based superconductors. The magnetic and nematic phase transitions may be both first order as in  $\text{SrFe}_2\text{As}_2$ , or both second order as in  $\text{BaFe}_{2-x}\text{Ni}_x\text{As}_2$ . Within spin-nematic scenario, it is possible for a system to establish the nematic phase as second order while keeping the magnetic transition first-ordered. Experimentally, it is rather hard to distinguish a second-order transition from a weakly first-order transition. Here we have systematically studied the nematic susceptibility and magnetic susceptibility in the iron-based superconductor  $\text{Ba}_{1-x}\text{Sr}_x\text{Fe}_{2-y}\text{Ni}_y\text{As}_2$  by elastoresistivity and magnetic susceptibility measurements, respectively. The evolutions of the nematic and magnetic transitions from first order to second order can be continuously tuned by the substitution of Sr by Ba. Our results give a phase diagram that is consistent with the spin-nematic theory.

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