

Abstract Submitted
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Possible surface nematic order in iron pnictides¹ KOK WEE SONG, ALEXEI KOSHELEV, Argonne National Laboratory — Nematic fluctuations play important role in the physics of the iron-based superconductors. Indications for weak precursor nematic transition has been found in the compound $\text{BaAs}_{2-x}\text{P}_x\text{Fe}_2$ [1]. However, high-resolution specific-heat measurements did not reveal any bulk transition[2]. To resolve this controversy, we consider the possibility of the surface nematic transition preceding the bulk transition. We consider the simplest model of two interacting quasi-two-dimensional electronic bands and explore the free-surface effects on the nematic order. We found that three-dimensional effects suppress the bulk nematic order and therefore this order is enhanced near the surface.

[1]Kasahara, S., et al. "Electronic nematicity above the structural and superconducting transition in $\text{Ba}(\text{As}_{1-x}\text{P}_x\text{Fe})_2$." *Nature* 486.7403 (2012): 382-385.

[2]Luo, X., et al. "Antiferromagnetic and nematic phase transitions in $\text{Ba}(\text{As}_{1-x}\text{P}_x\text{Fe})_2$ studied by ac microcalorimetry and SQUID magnetometry." *Physical Review B* 91.9 (2015): 094512.

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