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Instability of ferroelectric states induced by coexisting charge orders[1] MAXIM MOSTOVOY, Zernike Institute for Advanced Materials, MARCUS VAN DER VEGTE, University of Groningen — Ferroelectricity induced by coexisting site-centered and bond-centered charge density waves, was observed in a number of quasi-one-dimensional organic materials, such as TTF-CA and $(TMTTF)_2X$. It was also suggested that the interplay between charge, orbital, and spin degrees of freedom in doped manganites results coexisting site- and bond-centered alternations of the electron charge density close to half doping, making these materials ferroelectric. We discuss ferroelectric states induced by coexisting charge density waves from a phenomenological point of view and show that close to ordering transition they are inherently unstable towards an incommensurate modulation of charge density, which breaks the homogeneous states into domains separated by electrically charged domain walls. Our results explain phases observed in doped manganites, vanadium dioxide and other materials. We also present a microscopic model of the incommensurate state in the frustrated spin-Peierls compounds TiOCl and TiOBr.

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