From Condensed Matter to Cosmology: studying the early universe under the microscope.

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Uncovering the behaviour of the early universe just after the Big Bang is an intriguing fundamental activity that is extraordinarily difficult because of insurmountable issues associated with replaying the Big Bang in the laboratory.

One route to the answer -- which lies at the intersection between cosmology and condensed matter physics -- is to use laboratory materials to test the laws proposed for the formation of defects such as cosmic strings in the early universe.

Here I will show that a popular multiferroic material, with its coexisting magnetic, ferroelectric and structural phase transitions, generates the crystallographic equivalent of cosmic strings.

I will describe how straightforward solution of the Schrödinger equation for the material allows the important features of its behaviour to be identified and quantified, and present experimental results of what seem to be the first unambiguous demonstration of the expected cosmological scaling laws in a real material.

I will end with a plea for help with imaging the multiferroic "cosmic strings", and show some recent data suggesting that things might be less unambiguous than they seem.