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The Possibility of Phonon-Mediated Superconductivity in an Iron-Based Material SHEENA SHAH, ELENA ROXANA MARGINE, ALEKSEY KOLMOGOROV, University of Oxford — We have identified a synthesizable candidate FeB4 material with a potential for conventional superconductivity at 15-20 K [1,2]. The strong electron-phonon coupling in the proposed material is unexpected as the recently discovered iron-based superconductors are considered to display an unconventional pairing mechanism. The new nonmagnetic ground state crystal structure has been predicted with an ab initio evolutionary search [3] and shown to be marginally stable at ambient pressures.

[1] A. N. Kolmogorov, S. Shah, E. R. Margine, A. F. Bialon, T. Hammerschmidt, R. Drautz, Phys. Rev. Lett. 105, 217003 (2010).
[2] A. F. Bialon, T. Hammerschmidt, R. Drautz, S. Shah, E. R. Margine, A. N. Kolmogorov (submitted)
[3] A. N. Kolmogorov, MAISE (http://maise-guide.org)

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