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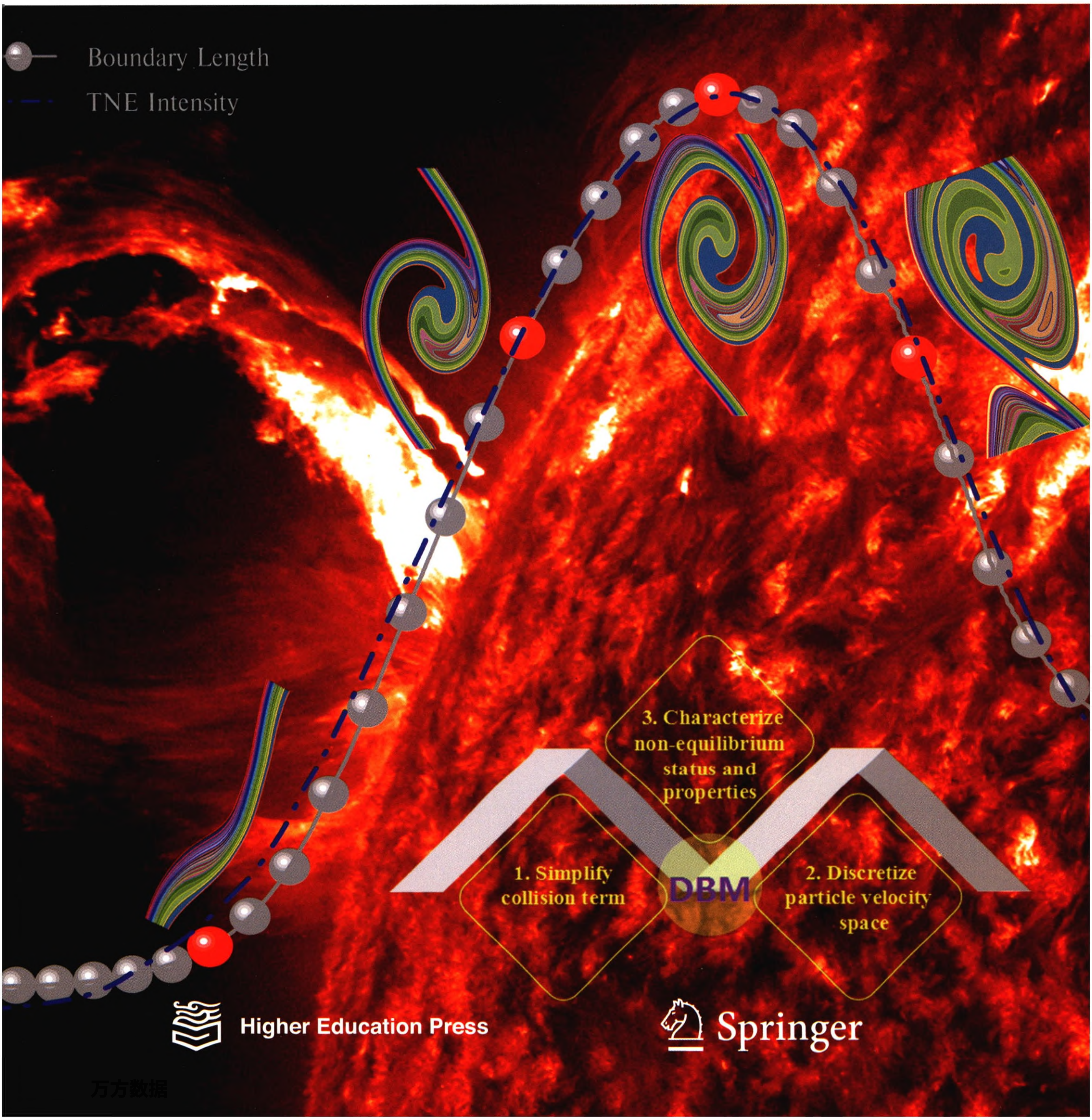

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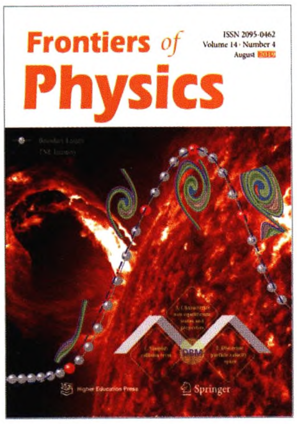

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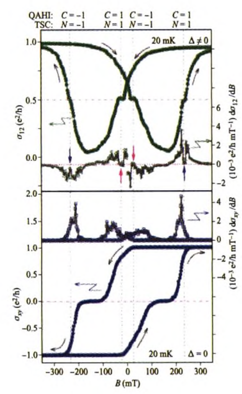

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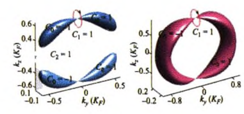

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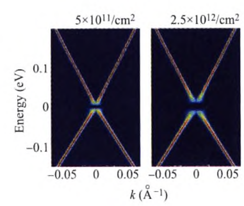

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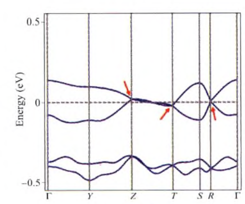

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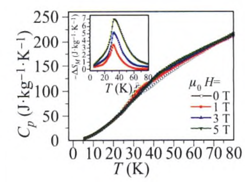

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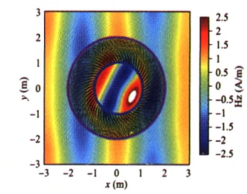

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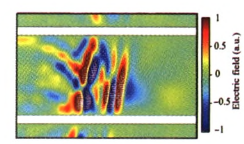

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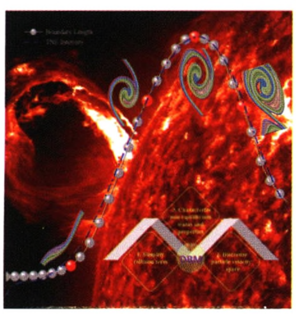

Cover

As an efficient initiating mechanism of turbulence and mixing of fluids, the Kelvin-Helmholtz instability (KHI) plays crucial roles in both scientific research and engineering applications, such as high-energy-density physics, geophysics and astrophysics, inertial confinement fusion, and combustion. Although it has been investigated extensively over the past decades, the kinetic modeling, the thermodynamic nonequilibrium (TNE) effects, and the understanding of complex fields of KHI, are still open problems. Recently, an easily implementable kinetic discrete Boltzmann model (DBM) is designed to quantitatively investigate the often-overlooked TNE effects of KHI, via tracking the evolution of non-equilibrium measures and morphological functionals. The core idea that the authors convey is, DBM also provides a set of handy and effective tools to describe, measure, and analyze the most relevant TNE behaviors, besides presenting the same results of corresponding hydrodynamic equations. For more details, please refer to the article "Nonequilibrium and morphological characterizations of Kelvin–Helmholtz instability in compressible flows " by Yan-Biao Gan, Ai-Guo Xu, Guang-Cai Zhang, Chuan-Dong Lin, Hui-Lin Lai, and Zhi-Peng Liu, *Front. Phys.* 14(4), 43602 (2019). [Photo credits: Yan-Biao Gan (North China Institute of Aerospace Engineering), Ai-Guo Xu (Institute of Applied Physics and Computational Mathematics), and Ding Yuan (Harbin Institute of Technology, Shenzhen). Sun image: Courtesy of NASA/SDO and the AIA science teams.]

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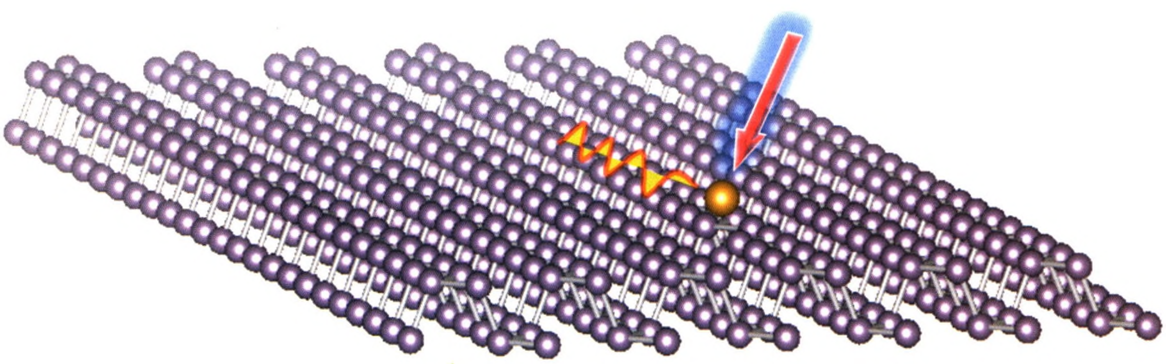

First-principles computations are performed to investigate phosphorene monolayers doped with 30 metal and nonmetal atoms. See: Jing-Hua Feng, et al., Computationally predicting spin semiconductors and half metals from doped phosphorene monolayers, *Front. Phys.* 14(4), 43604 (2019).

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