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Supercurrents and Andreev bound states in a superconducting/strained/superconducting silicene junction HAI LI, Univ of Houston, CHIN-SEN TING, Department of Physics and Texas Center for Superconductivity, University of Houston, Houston, Texas 77004, USA — Based on the Dirac-Bogoliubov-de-Gennes equation, we investigated strain effects on the supercurrent and Andreev bound states (ABSs) in a superconducting/strained/superconducting silicene junction. Owing to the novel buckled structure of silicene, the supercurrent and ABS configurations can be effectively controlled by a perpendicular electric field. It was found that the supercurrent strongly depends on the direction of the strain, and the supercurrent exhibits a on/off effect under certain strains. It was demonstrated that the spin-valley symmetry of silicene can induce a spin-valley polarized supercurrent, even though the strength of the supercurrent is strongly modulated by the strain. These findings would potentially provide some intriguing insights into the correlation transport in strained silicene-based superconducting hybrid structures.

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