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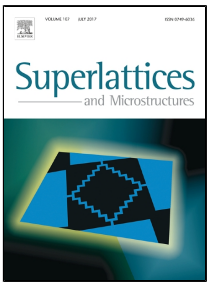


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# Optical and electric control of charge and spin-valley transport in ferromagnetic silicene junction

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**Abstract**: We theoretically investigate the charge and spin-valley transport in a normal/ferromagnetic/normal silicene junction, where the ferromagnetic region is exposed to an off-resonant circularly polarized light and perpendicular electric field. We show that one wider transport gap can be produced by the optical field than the electric field, which provides a simple way to fabricate an optical controlled on/off switch. On the other hand, in the presence of a proper optical field and ferromagnetic exchange field, the spin-polarized conductance is enhanced above 90%, and the polarized direction can be inverted just by reversing the polarization of the light. Additionally, the valley-polarized conductance is sensitive to the optical and electric field, under proper values, one near perfect $K(K')$ valley-polarized conductance exceeding 95% is realized. All these findings are well understood from the band structure of silicene and expected to be beneficial for real applications in high performance spintronics and valleytronics.

**Keywords:** Spintronics;Valleytronics; Silicene; Ferromagnetic; Optical

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