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Spin blockade effect in single-molecule transistors[1] GUANGPU LUO, KYUNGWHA PARK, Virginia Tech, Blacksburg, Virginia — Recently single-molecule transistors consisting of individual single-molecule magnets trapped between electrodes have been experimentally realized and electron transport properties through individual single-molecule magnets have been measured. For a single-molecule magnet the (2S+1)-fold degeneracy of magnetic levels in a given spin multiplet is lifted even in the absence of external magnetic field, due to the magnetic anisotropy induced by spin-orbit coupling. This anisotropic nature of single-molecule magnets allowed one to discover interesting, unexpected transport properties. A recent theoretical study showed that an Eu-based anisotropic magnetic molecule can switch its magnetic anisotropy between magnetic easy plane and easy axis upon varying the charge state of the molecule. Motivated by this report, we investigate how this switch of magnetic anisotropy influences the electron transport through the molecule, by considering sequential electron tunneling. We calculate current-voltage characteristics by solving the master equation based on the model Hamiltonians. We explore this interesting effect in the absence and presence of external magnetic field.

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