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Optical properties of quantum dots in buckled graphene-like materials THAKSHILA HERATH, VADYM APALKOV, Georgia State University — The band gap of buckled graphene-like materials, such as silicene and germanene, depends on external perpendicular electric field. A specially design profile of electric field produces a quantum dot, i.e., trapping potential for electrons in such materials. We theoretically study the optical properties of such silicene/germanene quantum dots. There are two types of absorption spectra in the quantum dot: interband (optical transitions between the states of the valence and conduction bands) and intraband (transitions between the states of conduction/valence band). The interband absorption spectra have triple-peak structure with peak separation around 10 meV, while intraband absorption spectra, which depend on the number of electrons in the dot, have double-peak structure with separation between the peaks around 15meV. The interband optical spectra as a whole are red-shifted with increasing electric field in the internal region of the quantum dot, while the energy separation between the peaks depends weakly on the electric field. With increasing the size of the quantum dot, the interband and intraband absorption spectra become red shifted as well.

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