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Heterostructure quantum wires as an ideal source of entangled photon pairs RANBER SINGH, GABRIEL BESTER, Max Planck Institut Stuttgart — We show [1] that based on symmetry arguments, *idealised* quantum nanostructures grown along the [111] direction, such as self-assembled quantum dots or heterostructure wires must have a vanishing FSS. We confirm this prediction by million-atom empirical pseudopotential many-body calculations of *realistic* structures. We use experimentally realised shapes, compositions and sizes and find that the vanishing FSS must be present in experimentally realized structures. We further study how robust the results are against deformations and conclude that [111] grown structures, especially heterostructure wires, are ideal candidates for the generation of entangled photon pairs. Through the control of size, shape and composition they would emit at the optical fibre communication wavelength (conventional C band) of 1.55 μm (0.8 eV). The suggested structures, and their atomistic symmetry, are tolerant of imperfections in their interfaces, unlike [001] grown structures, which should boost their attractiveness. [1] Phys. Rev. Lett. **103**, 063601 (2009)

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