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## X-ray diffraction imaging of a single quantum dot

Epitaxially grown self-assembled semiconductor quantum dots (QDs) offer atom-like optical properties, making them ideal for single photon sources in quantum technologies. Selecting a QD with specific characteristics is crucial for noise-free, indistinguishable photons. We developed a screening protocol to identify the best QD from multitude of simultaneously grown dots. Our study revealed anisotropic elemental composition within single QDs, challenging existing models assuming lateral azimuthal symmetry. Additionally, we observed a progressive rotation of in-plane lattices, forming naturally occurring chiral structures. This groundbreaking discovery of nanoscale chirality within zero-dimensional QDs has profound implications for revolutionizing quantum technology.

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Studies of atomic and nanostructured surfaces and interfaces

**Primary author:** DEY, Arka Bikash (Deutsches Elektronen-Synchrotron (DESY))

**Co-authors:** Dr SCHROPP, Andreas (Deutsches Elektronen-Synchrotron (DESY)); Mr ACHILLES, Silvio (Deutsches Elektronen-Synchrotron (DESY)); Dr KELLER, Thomas (Deutsches Elektronen-Synchrotron (DESY)); Dr FARRER, Ian (Deutsches Elektronen-Synchrotron (DESY)); Prof. RITCHIE, David A. (University of Cambridge); Dr BERTRAM, Florian (Deutsches Elektronen-Synchrotron (DESY)); Prof. SCHROER, Christian G. (Deutsches Elektronen-Synchrotron (DESY)); Dr SEECK, Oliver (Deutsches Elektronen-Synchrotron (DESY)); SANYAL, Milan (Saha Institute of Nuclear Physics)

**Presenter:** DEY, Arka Bikash (Deutsches Elektronen-Synchrotron (DESY))

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