Crystal orientation quantification in less than 10 seconds

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X-ray diffraction is one of the basic analytical methods that are routinely utilized for both materials research and quality control processing. It is non-destructive and offers high precision and accuracy in lattice distance and orientation measurements.
The classic orientation method via rocking curves at different azimuthal angles is a widely spread method that yields results in 10-30 minutes for near vicinal crystals. Here we present a fast method that can orient both boules for sawing and check the wafer offcut and flat orientation as QC tool for both manufacturer and wafer client. Offcut magnitude precision is evaluated to 0.003° 1σ and automation options range from manual to fully fab compliant to cover the needs of both research and industry with benchtop to workfloor sized installations. This is a breakthrough in methods compared to current industrial standards and would enable control of each individual wafer at a throughput of more than 2.5 million wafers per tool per year.