3.5: Borrmann Effect

Due to anomalous absorption, type 1 wavefields propagate in a perfect or nearly perfect crystal with a less than normal absorption. For details and the physical interpretation, see anomalous absorption.

Super-Borrmann effect

It is the enhancement of the Borrmann effect in a three-beam case, *e.g.* when the \(111\) and $\overline{111}$ reflections are simultaneously excited in a silicon or germanium crystal.

History

The Borrmann effect was first discovered in quartz (Borrmann G., 1941, *Über Extinktionsdiagramme der Röntgenstrahlen von Quarz. Physik Z.*, **42**, 157-162) and then in calcite crystals (Borrmann G., 1950, *Die Absorption von Röntgenstrahlen in Fall der Interferenz. Z. Phys.*, **127**, 297-323), and interpreted by Laue (Laue, M. von, 1949, *Die Absorption der Röntgenstrahlen in Kristallen im Interferenzfall. Acta Crystallogr*. **2**, 106-113).

The super-Borrmann effect was first observed by Borrmann G. and Hartwig W. (1965), *Die Absorption der Röntgenstrahlen im Dreistrahlfall der Interferenz. Z. Krist.*, **121**, 401-409.

See also

- Section 5.1 of *International Tables of Crystallography, Volume B* for X-rays
- Section 5.2 of *International Tables of Crystallography, Volume B* for electrons
- Section 5.3 of *International Tables of Crystallography, Volume B* for neutrons