

[time-of-flight USANS]
(Chapter 5.4.3 in *Elements*)

Time-of-Flight USANS

In the time-of-flight version of USANS, the monochromating and analyzing crystals reflect not only the lowest-order Bragg reflections, but in principle, higher order as well; see *Elements*, Eq 5.22. Those of these higher orders arrive at the detector in peaks at distinctly different times and the higher-order reflected neutrons span different ranges of Q . Higher-order, shorter-wavelengths correspond to smaller minimum Q because the angular range of reflected neutrons is proportional to the square of the wavelength; see Eq. 5.23 in *Elements*. Developers of the t-o-f USANS instrument at SNS find that the Q -resolution function for higher-order reflections is not of the triangular form observed for first-order reflections. This is a result of deviations from the theory that applies for first-order reflections, which is the subject of ongoing investigations.