



ESRF

Experiment title: Quasielastic scattering of nuclear resonant synchrotron radiation

Experiment number:

MI 95

Beamline:

ID18

Date of experiment:

from: Aug. 9th to: Aug 17th 1996

Date of report:

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Shifts:

**9 hybrid +
9 16-bunch**

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Quasi-Elastic Scattering of Synchrotron Radiation by-Time Domain Interferometry

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We use synchrotron radiation and time resolved x-ray detection to measure structural relaxations of glycerol ($C_3H_5(OH)_3$) having time scales of 30 to 200 ns at 1.5\AA^{-1} momentum transfer. Foils containing ^{57}Fe (14.4 keV nuclear resonance, 141 ns lifetime) are placed before and after the non-resonant sample, and a small difference (-70 MHz) is established in their nuclear response frequencies. Quasi-elastic scattering from the sample perturbs the 70 MHz quantum beat pattern of the nuclear scattering. A simple model relates the perturbation to the dynamic structure factor of the sample.

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* Note, due to editing and/or space constraints the printed version may be slightly different.