



ESRF

	Experiment title: Iron Partial Vibrational Density of States in d-AlNiFe	Experiment number: HS 1762
Beamline: ID18	Date of experiment: from: 26 March 2002 to: 30 March 2002	Date of report: February 28, 2003
Shifts: 12	Local contact(s): Dr. Aleksander Chumakov	<i>Received at ESRF:</i>
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Report:

The purpose of this experiment was to measure the iron-partial vibrational density of states $g(E)$ in the decagonal quasicrystal d-AlNiFe using nuclear inelastic scattering (NIS). Parallel inelastic neutron scattering experiments at ILL on isotope-substituted samples have yielded the three different atomic-partial $g(E)$ functions using a new separation algorithm. The purely incoherent iron-partial results of the current experiment were needed to test the reliability of this new method at the very low iron content of this sample (ca. 5 %).

In the figure, the different iron-partial and total $g(E)$ results are shown. In the case of our samples, the low iron concentration leads to some difficulties in calculating $g_{\text{Fe}}(E)$ accurately from the neutron (INS) results alone. This result shows the importance of the possibility to independently measure the atomic-partial vibrational density of states with this new method. These results, together with other neutron scattering experiments, have now been submitted for publication [1].

[1] R.A. Brand et al., submitted (2003).

