# Analysis of the structure of compressed liquid Ni and Co by EXAFS

S. BOCCATO[1]*, R. TORCHIO[1], P. D'ANGELO[2], A. TRAPANANTI[3], I. KANTOR[1,4], V. RECOULES[5] AND S. PASCARELLI[1]

[1]ESRF - European Synchrotron Radiation Facility, Grenoble, France (*correspondence: silvia.boccato@esrf.fr)
[2]Department of Chemistry, University of Rome "La Sapienza", Rome, Italy
[3]CNR – Istituto Officina dei Materiali, Perugia, Italy
[4]Danmarks Tekniske Universitet, Lyngby, Denmark
[5]CEA, Bruyeres le Chatel, 91297 Arpajon Cedex, France

The study of the local structure of a liquid metal, especially such as nickel which is one of the constituents of Earth's liquid outer core [1], has not only a fundamental but also a significant geophysical interest. It's knowledge gives some insight in understanding the viscosity of Earth's outer core, of interest in the modeling of the geodynamo [2]. X-ray Absorption Spectroscopy (XAS) due to its short order sensitivity, not only allows to detect the transition to the liquid phase [3], but also its Extended X-ray Absorption Fine Structure (EXAFS) region can be analysed to study the local structure of the molten phase [4].

We have analysed several P, T points above the melting curve in the nickel and cobalt phase diagrams. The fit of the EXAFS signal, shown in Figure 1 for one pressure, gives the first neighbours distance R. The trend of R as a function of pressure for nickel and cobalt was determined up to 100GPa and 80GPa respectively.

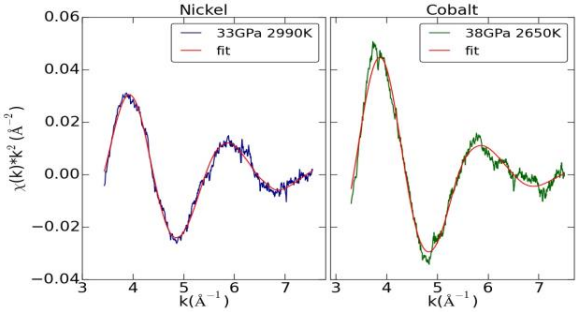


**Figure 1:** Fit of EXAFS signal nickel and cobalt data at about 35 GPa.

[1] J. Li et al., Geochimica et Cosmochimica Acta 65, 1821 (2001). [2] G. Shen et al., Europhysics Letters 52, 151 (2000). [3] G. Aquilanti et al., PNAS 112, 12042 (2015). [4] A. Di Cicco et al., PRB 89, 060102(R) (2014).