

## MÖSSBAUER AND SANS STUDIES OF ANTI-INVAR Fe-Ni-C ALLOY UNDER MAGNETIC FIELD

**V. M. Nadutov<sup>1</sup>, S. G. Kosintsev<sup>1</sup>, Ye. O. Svystunov<sup>1</sup>, V. M. Garamus<sup>2</sup>, R. Willumeit<sup>2</sup>, H. Eckerlebe<sup>2</sup>, T. Ericsson<sup>3</sup>, S.G., H. Annersten<sup>3</sup>**

<sup>1</sup> *G.V. Kurdyumov Institute for Metal Physics of the N.A.S. of Ukraine, Kyiv, Ukraine*

<sup>2</sup> *GKSS research center, Geeshtacht, Germany*

<sup>3</sup> *Uppsala University, Uppsala, Sweden*

It was revealed that the f.c.c.-Fe-(20-25)%Ni-C alloys show abnormally enhanced thermal expansion coefficient (TEC) ( $\sim 20 \cdot 10^{-6} \text{ K}^{-1}$ ) within the temperature range between the Curie temperature and martensitic point and it is accompanied by almost temperature-insensitive behaviour that points to anti-Invar effect by opposite to Invar behaviour. Usually an essential differences between Invar and anti-Invar behaviour is considered in terms of the magnetically ordered-disordered states: in the former one the volume effect occurs essentially in magnetically ordered state, whereas in the latter it occurs in the magnetically disordered one. However, the Mössbauer analysis and SANS experiment in external magnetic field of 1,5 – 5 T have revealed an existence of magnetic inhomogeneities in the studied anti-Invar alloys below and above the Curie point. This is consistent with the ideas concerning ferromagnetic and antiferromagnetic exchange interspin interactions in the studied alloys and the earlier hypothetical model regarding moment-volume instability. The effect of carbon on anti-Invar behavior of the f.c.c.-Fe-(20-25)%Ni-C alloys is considered from the point of view of stabilization of austenitic phase at low temperatures and magnetic ordering.

**Presenting author:** Volodymyr M. Nadutov  
**Address:** G.V. Kurdyumov Institute for Metal Physics of N.A.S. of Ukraine  
Academician Vernadsky Blvd., 03680 Kiev, Ukraine  
**FAX:** +380 44 424 3305  
**E-mail:** [nadvl@imp.kiev.ua](mailto:nadvl@imp.kiev.ua)