	Experiment title: Physical aging in vitreous silica and vitreous germania	**Experiment number**: HC1140
Beamline:	**Date of experiment**: from: 06/11/2013 to: 12/11/2013	**Date of report**: 09/12/2013
Shifts:	**Local contact(s)**: B. Ruta	*Received at ESRF:*

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Report:

Glasses play a role difficult to overestimate in our life; still, many of their properties remain the subject of fundamental studies, since their intrinsic non-equilibrium nature poses formidable problems both at the theoretical and experimental level. Despite centuries of study, still very little is known on the dynamics of glasses at the atomic level, due to both experimental and computer limitations.

Thanks to the unique capabilities offered today by X-ray Photon Correlation Spectroscopy in a third generation synchrotron source, we have been able to measure the atomic dynamics in both vitreous silica and germania for different temperatures in the glassy state and for different wave vector in the glassy state.

To enhance the total measured signal, speckle patterns were recorded by using two IkonM charge-coupled device (CCD) from Andor Technology installed in the vertical scattering plane, ~67 cm downstream of the sample, and symmetrically with respect to the incoming beam. In this way the two detectors cover the same solid angle and the same wave vector Q with a resolution of DQ= 0.04 $Å^{-1}$. The scattered intensity was collected in horizontal plane for wave vector Q around the maximum of the static structure factor which is at ~1.5 $Å^{-1}$ in these systems. At each temperature series up to 2000 images were collected with an exposure time of 3-5sec per frame.

A preliminary analysis seems to reveal a very complex atomic dynamics in network glasses, characterized by relatively fast relaxation time and the absence of any detectable physical aging on the experimental time scale of several hours per temperature. These results strongly differ from those found in metallic glasses, while present many similarities with the atomic dynamics recently observed in silicates glasses (see Reports HD548 and HD607). Some differences with respect to the dynamics of silicates glasses are observed which could be related to differences in the corresponding network structure. The analysis of the data is still ongoing but we are confident that these results will strongly improve our knowledge on the glassy state.