ESRF	**Experiment title:** Size distribution and radial density profile of synaptic vesicles by SAXS	**Experiment number**: SC-2190
Beamline: ID02	**Date of experiment**: from: 20.04.2007 to: 23.04.2007	**Date of report**: 13.03.2008
Shifts: 9	**Local contact(s)**: Michael Sztucki	*Received at ESRF:*

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Report:

We report on Small Angle X-ray Scattering experiments addressing the averaged structural properties of synaptic vesicles from rat and mouse brain.

The synaptic vesicles were isolated by the Jahn group by a modified protocol [1] after Huttner et al. 1983, originally developed by Whittaker et al., cf. Nagy et al. 1976. The synaptic vesicles were kept in glass capillaries or in a flow through cell with a diameter of 1.5 mm, respectively. The minimal sample volume was approximately 15 l. Scattering pattern were recorded over a q-range of 0.016 to 5.5 nm^{-1} at an photon energy of 12.4 keV for various different buffer conditions such as altered pH, pronase treatment and different Calcium, Magnesium and Potassium concentrations. Unilamena lipid vesicles with and without integrated fusiogenic protein synaptobrevin as well as Aurum colloids were studied and serve as model systems.

Radiation damage was ruled out by series of different exposure times from 0.01 to 10 seconds. Dilution series revealed no measurable interparticle correlations for all available protein concentrations of up to approximately 6 µg/µl. Thus the structure factor can be assumed to be equal or close to one.

From the measurements and the quantitative fitting of the SAXS curves one obtains the width of the size distribution function and the radial density profile of the synaptic vesicles as shown by work in progress in figure 1.

The data is currently analyzed in particular to extract the respective changes with external parameters.

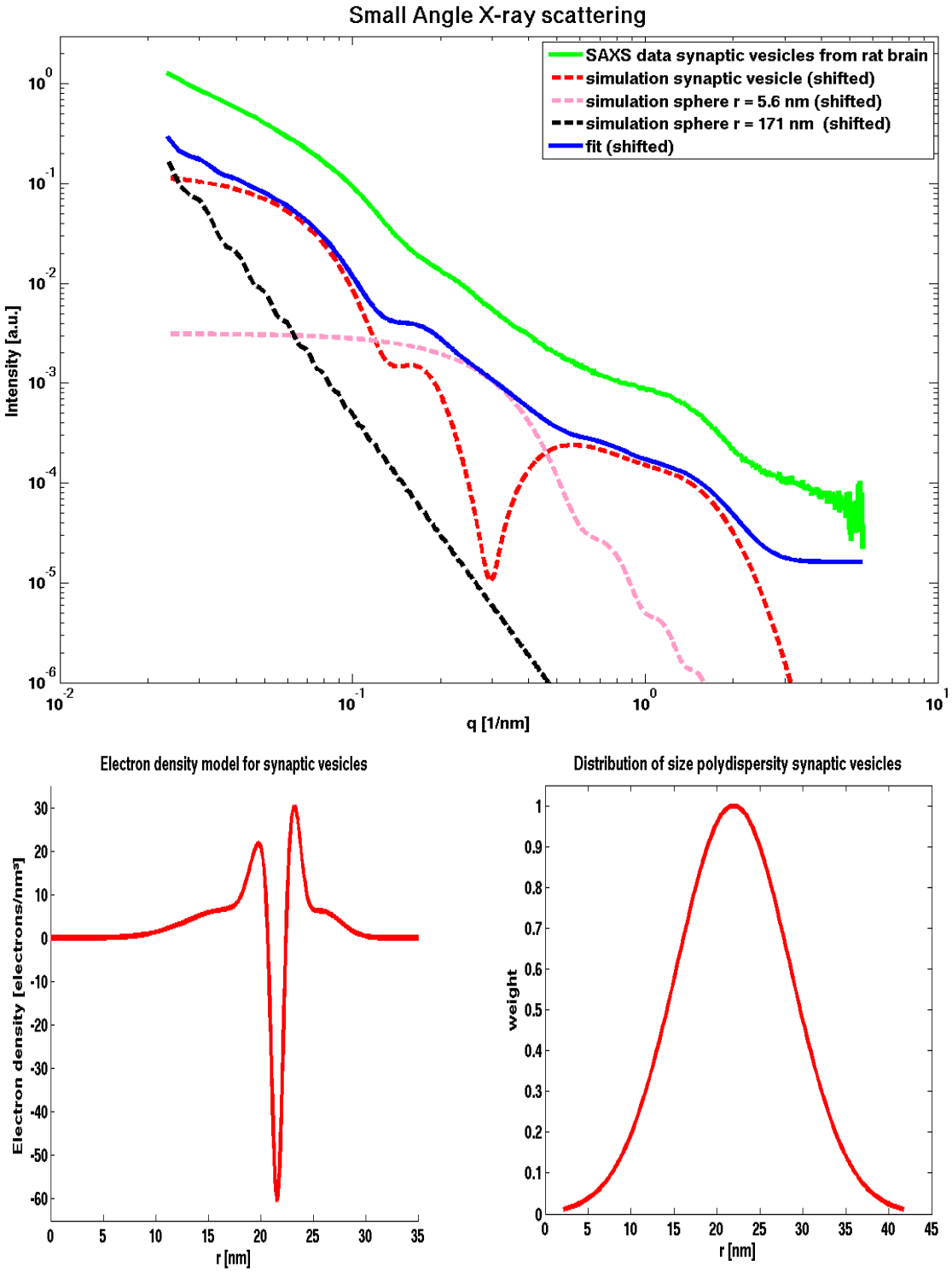

Fig. 1 (top) Small Angle X-ray data of synaptic vesicles from rat brain fitted with spherical symmetric model of synaptic vesicles consisting of five superimposed gaussians as electron density (bottom left) and two additional populations of homogeneous, spherical particles. The gaussian shaped size polydispersity function of the synaptic vesicle model is centered around a mean radius of approximately 21 nm (bottom right).

References:

[1] Shigeo Takamori et al. Molecular anatomy of a trafficking organelle. *Cell*, 127:831 – 846, 2006.