To solve the structure of a membrane protein to atomic resolution is still a challenging task. Apart from conventional crystallization techniques the use of lipidic cubic phase (LCP) is of growing interest [1]. The LCP three-dimensional networks consist of a continuous bilayer defined by two distinct water channels, referred to as bicontinuous networks (Figure 1)[2]. Most commonly MO is used, forming cubic phases at temperatures suitable for crystallization [3]. Nevertheless the network gets easily destabilized upon variation of water content, changes in temperature and addition of chemicals [4]. The phase behaviour of MO is effected by the addition of detergents, known to facilitate the crystallisation of membrane proteins [5]. Detergents used during the experiments, were chosen, according to a ranking from the Membrane Protein Data Bank. Among the twenty most successfully detergents are apart from alkyl glycosides and maltosides a number of ethers with different chain lengths.

To study the influence of different detergents on the phase behaviour of MO the lipid was mixed with varying concentrations of the individual detergents. The dispersion was transferred to glass capillaries and measured at the beamline A2, determining the scattering pattern in the small angle...
regime under variation of the temperature. The collected data was averaged and integrated and the
scattering patterns were compared, analysing the changes in the network structure (Figure 2).
In depth data analysis is in progress. With the derived information a more detailed understanding of
the phase transitions in this complex mixtures can be achieved, helping to rationalize the design of
suitable conditions for protein crystallisation.

![Figure 2: Example for temperature-dependent data derived for the detergent laurylmaltoside (LM) in mixture with MO. Samples containing 0.05 % LM still exhibit the cubic phase, whereas the samples with 8% LM exhibit a lamellar phase](image)

References