

A neutron enters a bar and meets a microgel, a cubosome, and a spaghetti strand...three tales on small-angle neutron scattering with contrast variation

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Small-angle neutron scattering (SANS) with contrast variation is a fundamental tool to study soft materials, from model systems for soft spheres to understand the role of softness on the phase behaviour and flow properties of materials and complex fluids (e.g. microgels), to nanoparticles for applications such as drug delivery (e.g. cubosomes) and also to unravel the perfect cooking conditions of spaghetti. In this talk, I will present different applications of SANS with contrast variation, combined with complementary small-angle X-ray scattering. I will show how one can access the information on soft and compressible colloids (microgels) in crowded and overcrowded conditions using the so-called tracing methods [1]. Then I will show how SANS and contrast variation can be used to quantify the response of cubosomes to external osmotic stress [2]. Finally, I will use SANS with contrast variation to disentangle the structure of the gluten matrix and the structures of starches in regular and gluten-free spaghetti to show how different cooking times and salt concentrations affect the structural evolution of the pasta [3].

Keywords:

neutron scattering, contrast variation, microgels, cubosomes, spaghetti

References:

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