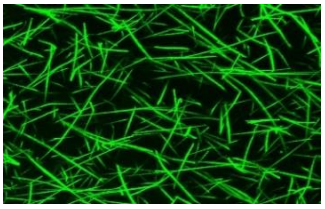
Light Scattering & To.Sca.Lab

The Light Scattering group, led by Prof. Fabio Ferri, works in the field of nano-particle and complex fluid characterization, with particular emphasis on the development of new optical methods for static and dynamic light scattering, turbidimetry, novel imaging techniques, speckle metrology, velocimetry and particle sizing.

The experimental activities are being carried out at two optics laboratories located at the Department of Science and High Technology in Como:

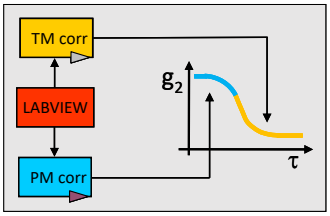
Light Scattering Lab (http://www.dfm.uninsubria.it/laboferri/) is an optic laboratory whose main activities regard:

- study of the growth kinetics and structure characterization of fibrin gels by using Light Scattering, turbidimetry, and Small Angle X-ray Scattering techniques.



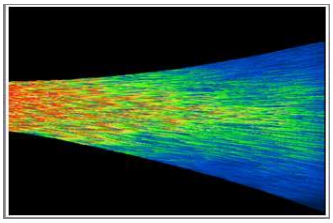
confocal image of a fibrin gel

- development of new data analysis algorithms and software correlators for Dynamic Light Scattering and Fluorescence Correlation Spectroscopy.



Our software 10 ns correlator

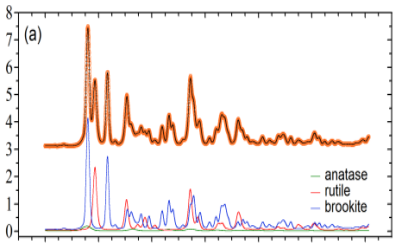
- development of speckle imaging velocimetry techniques based on the statistical analysis of the speckle produced by a moving fluid seeded with scattering nanoparticles.



Speckle imaging velocimetry

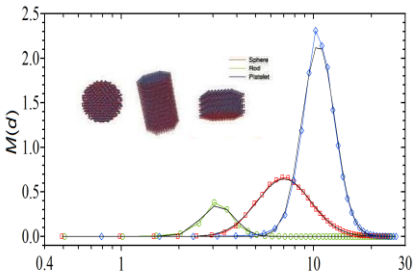
To.Sca.Lab (http://toscalab.uninsubria.it/) is an experimental and computational Laboratory that merges theoretical and experimental expertise in Chemistry, Crystallography and Physics within a unifying project based on Scattering Techniques (from X-rays to Visible Light), aiming at reconstructing structural, microstructural and dynamic behavior of nano-crystalline, partially ordered and disordered materials at different length scales (ranging from atomic resolution up to the mm size), and to correlate it with the material functional properties. The main activities regard:

- Debye Function Analysis (DFA) of Wide Angle X-ray Total Scattering (WAXTS) data for recovering structural, morphological and sizing information on crystalline nanoparticles.



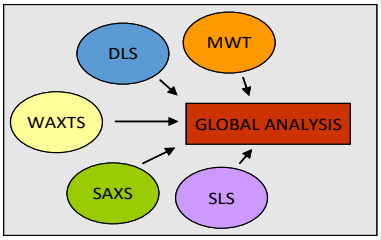
WAXTS data of TiO2 nanocrystyals

- development of inversion algorithms alternative to the WAXTS-DFA analysis, for the recovering of multi-variate nano-particle sizing distributions.



Multi-phase inversion of WAXT data

- development of a global data fitting and data inversion procedures in which the data coming from different techniques are *globally* processed for the nano-sample characterization.



Multi-techniques global analysis

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