

## MM 47: Invited talk Leoni

Time: Thursday 9:30–10:00

Location: H38

**Invited Talk** MM 47.1 Thu 9:30 H38  
**Nondestructive micro/nanostructure analysis using diffraction** — ●MATTEO LEONI — DICAM, University of Trento, via mesiano 77 - 38123 Trento, Italy

In the past 100 years, powder diffraction evolved from being a solution to the problem of obtaining large single crystals, to a versatile tool for materials analysis. The diffraction pattern and in particular the breadth and shape of the profiles, bear information not just on the structure but also on the micro/nanostructure of a material, such as shape and size distribution of the domains and lattice defects. Technologically relevant systems show however peculiar features that can

hardly be interpreted as simple broadening effects, especially when modular features, 2D character or stacking defects are present: the local and global structures differ and a stochastic description of the specimens is needed. The recent advances in the field, well beyond the commonly misused Scherrer formula, allow all those cases to be quantitatively studied in a non-destructive way by refining physical structure and microstructure parameters directly on the data collected ex situ, in situ or operando. Virtual experiments and virtual models, as well as computational tools, can then be used to assess the capabilities of the analysis methods and to extract further information on defect structure, material characteristics and their evolution. An overview and some examples will be given.