Contribution ID: **1145** Type: **Invited Oral Presentation**

M1Or3A-02 [Invited]: Role of strains in superconducting Nb3Sn

Monday, July 22, 2019 4:20 PM (20 minutes)

Superconducting Nb3Sn wires are actually in the focus to achieve enhanced high field performance, in particular for future advanced accelerator magnets of the next generation, by means of novel preparation methods to increase the flux pinning. It was learned already quite early in the development of the material that stresses and strains play an important role in the Nb3Sn system and strongly influence the superconducting properties, the critical temperature, the critical current and the upper critical field in a quite complex way. Strain effects in Nb3Sn were already investigated through more than 3 decades in the community by various methods and on the whole variety of samples, bulk, thin films and wires. Investigations on the microscopic scale, the scale of the crystal lattice are used to describe and understand the strain induced and related physical properties and investigations on macroscopic composite samples as wires were used to characterize the sample response as a whole under external stress load as from Lorenz forces in the application. In practical wires the situation is rather complex since most of phase is off-stoichiometric and doped with ternary additions as Ta and Ti which has significant influence on the strain response. Additionally different wire geometries and preparation schemes lead to much different boundary conditions for the stress state with important consequences for the application of superconducting wires. This contribution likes to review selected important investigations on the different aspects of strain effects, the applied experimental methods with their specific message and finally giving a short summary of the achieved understanding of the phenomena.

Primary authors: Dr GOLDACKER, Wilfried (Karlsruhe Institute of Technoloigy); Prof. FLUEKIGER, Rene (University Geneva DPMC)

Presenter: Dr GOLDACKER, Wilfried (Karlsruhe Institute of Technoloigy)

Session Classification: M1Or3A - Memorial Session: Dedicated to Prof. Tachikawa