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Polarization REsearch for Fusion Experiments and Reactors - The PREFER collaboration: purposes and present status

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The PREFER (Polarization REsearch for Fusion Experiments and Reactors) collaboration aims to address the know-hows in different fields and techniques to the challenging bet on fusion with polarized fuel. The efforts on a variety of duties and goals, which are under the responsibility of different institutes and research groups (indicated here by the representatives of the research center groups in the author list). Starting from still open questions of fusion reaction physics, as for example the study of d-d spin dependent cross sections (Vasilyev/La Cognata) to the acceleration of polarized ions from laser-induced plasmas (Büscher), there are many connections between the involved research groups. The collaboration is also tackling the production of nuclear polarized molecules, recombined from a polarized atomic beam (Engels), and its cryogenic condensation and transport (Ciullo/Statera). Other options for the production of polarized fuel are investigated in parallel, like spin separation of molecules in polarized molecular beam sources (Toporkov) or via photodissociation of molecules into polarized hydrogen/deuterium atoms (Rakitzis). The status of the different fields under investigation and the connections between these topics and the different research groups will be provided.

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