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## Edge plasma simulation and AMO physics: A multi-scale problem.<sup>1</sup> RALF SCHNEIDER, Max-Planck-Institut fuer Plasmaphysik, EURATOM Association, D-17491 Greifswald

Plasma edge physics is one of the major challenges in fusion plasmas. The need for power and particle exhaust for any reactor inspired a lot of theoretical and experimental work. Understanding this physics requires a multi-scale ansatz bringing together also several physics and numerical models. The plasma edge of fusion experiments is characterized by atomic and molecular processes. Hydrogenic ions and neutrals hit material walls with energies from several eV up to 1000s of eV. They saturate the wall materials and due to physical or chemical processes neutrals are released from the wall, both atomic and molecular. They determine via interaction with the plasma strongly its properties. A complete physics model for the plasma-wall interaction processes alone is already rather challenging (and still missing): it requires e.g. inclusion of collision cascades, chemical formation of molecules, diffusion in strongly 3D systems. A full description needs a multi-scale model combining quite different numerical techniques like molecular dynamics, binary collisions, kinetic Monte Carlo and mixed conduction/convection equations in strongly anisotropic systems.

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