

Sergei Dudarev

Sergei Dudarev, PhD Moscow, MA Oxford, has made transformative contributions to three areas of materials science: the density matrix approach in electron diffraction and electron microscopy, the electronic structure of transition metal and actinide oxides, and models for radiation damage in materials for nuclear power generation. When exploring UO₂, Dudarev developed a first principles approach that treats strong electron correlations on equal footing with chemical bonding in the material. This is now among the most frequently used *ab initio* methods, with the original work cited more than 5000 times. After joining the UK Atomic Energy Authority, Dudarev led the first *ab initio* investigation of radiation-induced intrinsic point defects, spanning the entire group of refractory bcc metals and iron, and highlighting the need to develop interatomic potentials that include magnetism. The first of such potentials was formulated in 2005, enabling simulations of radiation damage in iron on a million-atom scale. In 2007 Dudarev was appointed co-chair of the EU fusion materials programme where, following a large expansion of the programme in 2014, he became the leader of materials modelling part of it. Sergei Dudarev leads materials modelling and simulation research at UKAEA, he is a Visiting Professor in Materials at the University of Oxford, and a member of editorial boards of Journal of Nuclear Materials, and Nuclear Fusion.

