

Summary of research:

Our group at Imperial College London works on many aspects of dispersion forces (Casimir, Casimir-Polder and van der Waals forces) in the presence of magnetoelectric bodies. In particular, we are currently investigating Casimir-Polder and Casimir forces in thermal non-equilibrium beyond Lifshitz theory, and their applications in atom-surface interactions involving Rydberg atoms and polar molecules. Employing the powerful method of macroscopic quantum electrodynamics enables us to investigate dispersion forces on particles immersed in other dielectrics (liquids) as well as quantum and vacuum friction forces near arbitrarily shaped magnetodielectric bodies. We are also interested in novel materials such as carbon-based nanostructures (nanotubes and fullerenes) and other structured materials (metamaterials) with chiral or amplifying properties with a view towards tailoring dispersion forces and possibly making them repulsive.

Dr Stefan Scheel

Dr Stefan Yoshi Buhmann

John Alexander Crosse