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Van der Waals interactions in density functional theory[1]

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The van der Waals density functional which we introduced half a decade ago[2] and its self-consistent generalization[3] will be briefly reviewed. There are many collaborators in the application review that will follow, not only those who worked in the physics department at Rutgers[4] and at Chalmers,[5] but also at Denmarks Technical University,[6] the chemistry department at Rutgers,[7] and most recently at the University of Texas at Dallas.[8] I will expand on our recent review article,[9] which hopefully will be published before the present talk, and include applications by other groups not listed below. If possible, I will also review results from a more recent collaboration to study nucleosomal DNA and beyond.

[1]Supported by NSF and DOE
[2]M. Dion et al. Phys. Rev. Lett. **92**, 246401 (2004).
[3]T. Thonhauser et al., Phys. Rev. B **76**, 125112 (2007).
[4]Maxime Dion, Aaron Puzder, T. Thonhauser, Valentino R. Cooper, Shen Li, Eamonn Murray, Lingzhu Kong, and Kyuho Lee.
[5]Henrik Rydberg, Svetla Chakarova-Käck, Jesper Kleis, Elsebeth Schröder, Per Hyldgaard, and Bengt I. Lundqvist.
[6]Andrei Kelkkanen, Poul G. Moses, Jesper Kleis, and Bengt I. Lundqvist.
[7]Konhoa Li, Jing Li, Yves Chabal, and Wilma K. Olson.
[8]Nour Nijem and Yves Chabal.
[9]D. C. Langreth et al., J. Phys. Cond. Mat. (in press).