

# On the Relation of Ewald Summation and NFFT-Based Fast Summation

**Michael Pippig**

Chemnitz University of Technology  
Department of Mathematics  
09107 Chemnitz, Germany

*E-mail: michael.pippig@mathematik.tu-chemnitz.de*

The direct calculation of the long range Coulomb interactions for the classical N-body problem results in an arithmetical complexity of  $\mathcal{O}(N^2)$ . During this talk, we give an overview of fast approximate algorithms based on the nonequispaced fast Fourier transform that reduce the computational complexity to  $\mathcal{O}(N \log N)$ . Especially, we will investigate the commonalities and differences of Fast Ewald Summation and NFFT-based fast summation.