

## Summary for public relation work

### Project: P 23664-N13

#### The d-bar Neumann problem

The project was located at the intersection of several different fields : complex analysis, partial differential equations, functional analysis, operator theory, spectral analysis, potential theory and mathematical physics. The d-bar Neumann operator - the solution operator for the complex Laplacian defined on complex differential forms - provides an important tool to describe analytic and geometric aspects of the Cauchy-Riemann equations for several complex variables. Considering weighted  $L^2$ -spaces, an interesting connections to certain Schrödinger, Dirac and Pauli operators becomes apparent.

The first result of the project was the complete determination of the spectrum of the complex Laplacian on the Fock space. In addition it was shown that certain properties of the boundary of a domain imply that the corresponding d-bar Neumann operator can be extended as a continuous operator on larger  $L^p$ -spaces. During the time of the project the project leader finished a monograph with the title "The d-bar Neumann problem and Schrödinger operators", which appeared 2014 in the series De Gruyter Expositions in Mathematics.

Four master thesis were written under the supervision of the project leader, all candidates were supported by the funds of the project. Franz Berger continued as a PhD student and in the last year of the project two post docs joined the program.

The project leader gave many invited talks for conferences and seminars in France, England, Poland, Italy, Spain, Norway, Turkey, China, Mexico and USA. The international contacts where enhanced by WTZ-ÖAD projects with France (Nice, Marseille), Poland (Krakow) and Slovenia (Ljubljana).

In 2015 the workshop "Several Complex Variables and CR Geometry" at the Erwin Schrödinger Institute was organized by the members of the project with about 30 leading experts from all over the world.

Some members of the project, together with the leader, continue the work in a new approved FWF grant, which started in April 2016.