



## Mathematisches Forschungsinstitut Oberwolfach

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### Oberwolfach Seminar

High Frequency Approximations

### Date/ID:

12 October - 18 October 2014 (1442b)

### Organizers:

Caroline Lasser, München  
Olof Runborg, Stockholm  
Anders Szepessy, Stockholm

### Programme:

The seminar will study the numerical approximation for partial differential equations in the high frequency regime, when solutions have the form

$$a(t,y,\epsilon)e^{i\Phi(t,y)/\epsilon}$$

where  $1/\epsilon \gg 1$  is the large high frequency parameter. Examples include the wave equation, the Schrödinger equation, or Maxwell equations. High frequency equations pose difficult multiscale problems, since the wavelength  $\epsilon \ll 1$  is short compared to the overall size of the computational domain, and direct simulation techniques are very expensive if not unfeasible for such problems.

### Preparatory reading:

- Chapter 1 and 7.7 of G. Whitham's book on waves
- Chapter I and II in C. Lubich's blue book
- Chapter 1.8 in Harmonic Analysis in Phase space by G. Folland
- Langevin molecular dynamics derived from Ehrenfest dynamics by A. Szepessy, <http://arxiv.org/abs/0712.3656>
- Mathematical models and numerical methods for high frequency waves by O. Runborg, Commun. Comput. Phys., 2:827-880, 2007.
- Hagedorn wavepackets in time-frequency and phase space by C. Lasser, S. Troppmann, <http://arxiv.org/abs/1303.5192>

### Deadline for applications:

1 August 2014

The Oberwolfach Seminars are organized by leading experts in the field, and address postdocs and Ph.D. students from all over the world. The aim is to introduce the participants to a particular interesting development. The seminars take place at the Mathematisches Forschungsinstitut Oberwolfach. The Institute covers accommodation and food. By the support of the Carl Friedrich von Siemens Foundation, travel expenses can be reimbursed up to 150 EUR in average per person. Participants can ask for travel support during their stay in Oberwolfach at the guest office against copy of travel receipts. The number of participants of a seminar is restricted to 25.

**Applications** including:

- full name and address, including e-mail address
- short CV, present position, university
- name of supervisor of Ph.D. thesis
- a short summary of previous work and interest
- title, ID and date of the intended seminar

should be sent preferably by e-mail (pdf files) to:

**Prof. Dr. Dietmar Kröner**

Vice Director MFO

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