Berlin Mathematical School

BMS Friday Colloquium

Friday 19 January 2018 at 14:15
Tea & Cookies starting at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin
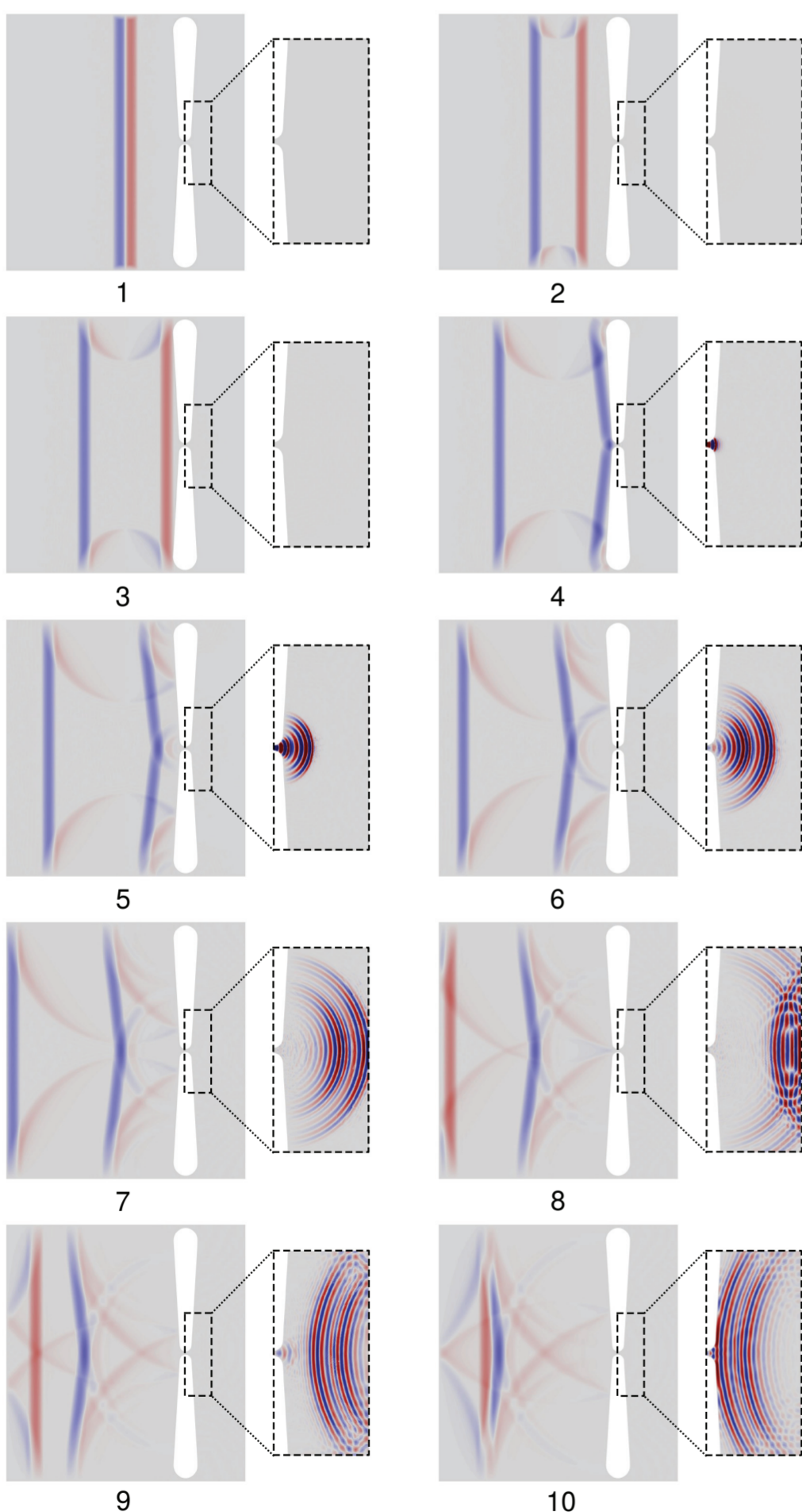
Marlis Hochbruck
(KIT)

On the numerical solution of linear Maxwell's equations

In her talk, Hochbruck discusses the numerical solution of time-dependent linear Maxwell's equations. For the space discretization, she will consider discontinuous Galerkin methods. After a general introduction, Hochbruck will focus on problems where the spatial mesh contains only a small number of tiny mesh elements, while most of the elements are coarse. Solving such problems with an explicit time integration scheme requires a time step size related to the diameter of the smallest mesh element to ensure stability, the well-known CFL condition. This makes the simulation inefficient, in particular if the number of tiny mesh elements is small.

Locally implicit methods overcome this restriction by treating only the tiny mesh elements implicitly while retaining an explicit time integration for the remaining coarse elements. Hochbruck will show how such methods can be constructed, she will present results of a rigorous error analysis, and then close with numerical examples. Joint work with Andreas Sturm (KIT), supported by the DFG CRC 1173.

Marlis Hochbruck is a German mathematician and professor of numerical analysis at the Karlsruhe Institute of Technology (KIT). Her research interests include time integration of partial differential equations. Hochbruck got her PhD from U Karlsruhe in 1992 and did her habilitation at U Tübingen in 1997. Her honors include a Heisenberg Fellowship (1998), and she is currently the speaker of CRC 1173 at KIT. Hochbruck was reelected last year as a Vice President of the German Research Foundation (DFG).

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