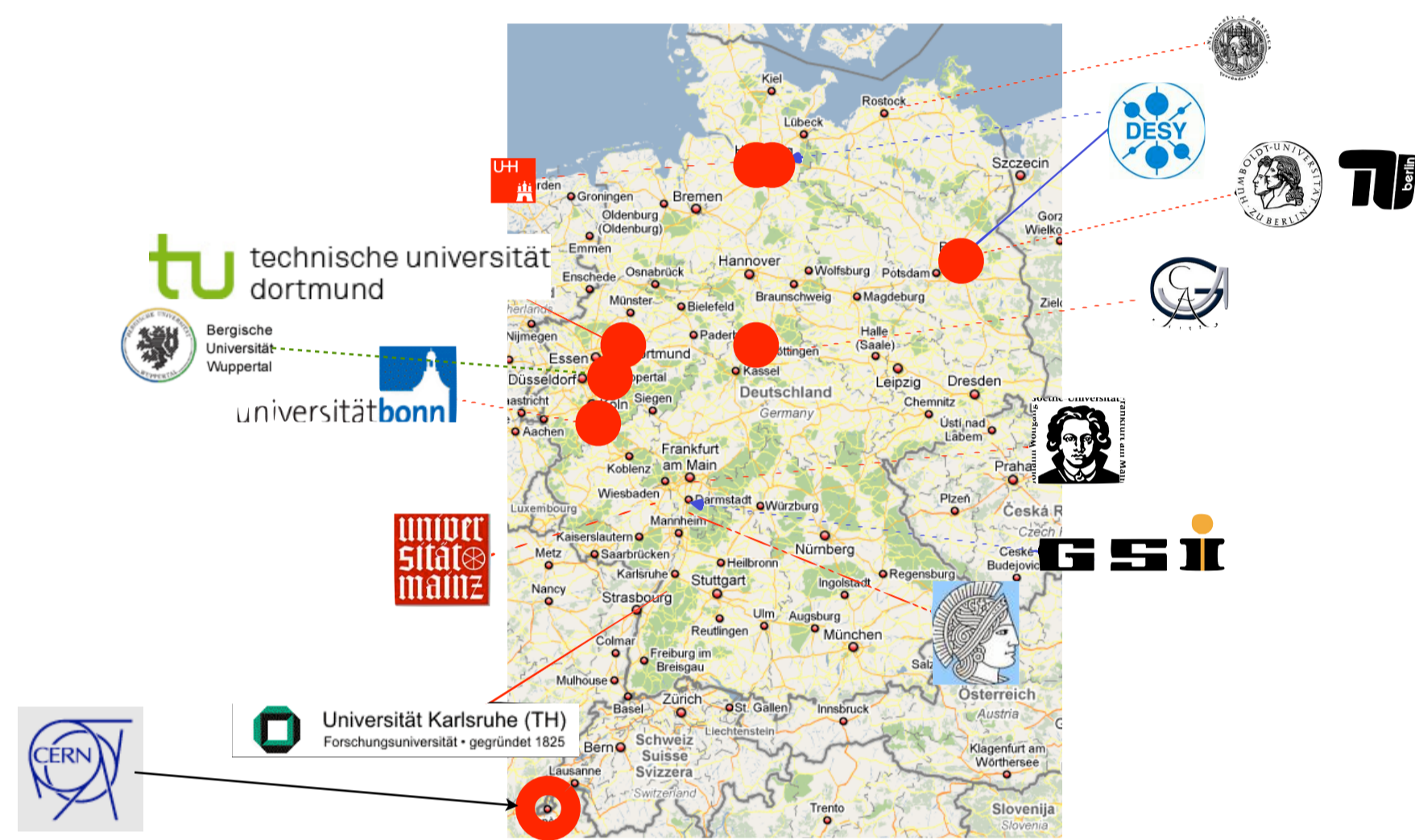


Goals of the Research Topic Accelerator

The Research Topic Accelerator tries to foster the education of prospective bright accelerator scientists that are needed to satisfy the demand for advanced accelerator physicists for the Terascale and beyond.

The scientific work focusses on advancing the concepts for high-energy, high-luminosity accelerators, in particular the e^+e^- -Linear Collider, to a state that allows the cost-effective implementation. On a longer time scale novel acceleration concepts are being envisaged.

Participating Institutes



Participating institutes and CERN

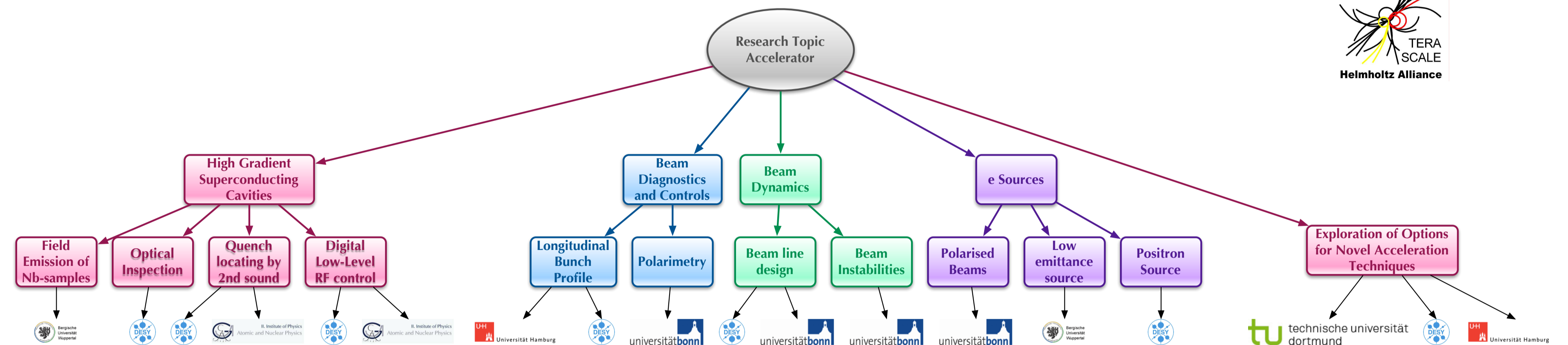
Education Accelerator Schools



Posters of the Accelerator Schools

The annual *Terascale Accelerator School* is organised by the Research Topic Accelerators of the Terascale Alliance. Lectures on Terascale Accelerators, notably the Large Hadron Collider and e^+e^- - Linear Colliders are offered to Master and Diploma students, who are not familiar with the topic. The courses are open to students after their 6th semester, i.e. after completing the basic education. Before concentrating on specific accelerator examples and their challenges an introduction into basic accelerator physics and the challenges of Superconducting RF acceleration forms part of the programme.

Research Topic Accelerator



The activities of Research Topic Accelerator and the Participating Institutes

The Research Topic Accelerator comprises the Universities

- Bonn
- Dortmund
- Hamburg
- Wuppertal
- DESY

The University of Göttingen is participating in close collaboration with DESY particularly in the educational programme.



Participants of the TAS2009 School in Bommerholz

Key to the success of the school are hands-on exercises in which the participants design their own accelerator, i.e. develop its optical description.

University Lectures

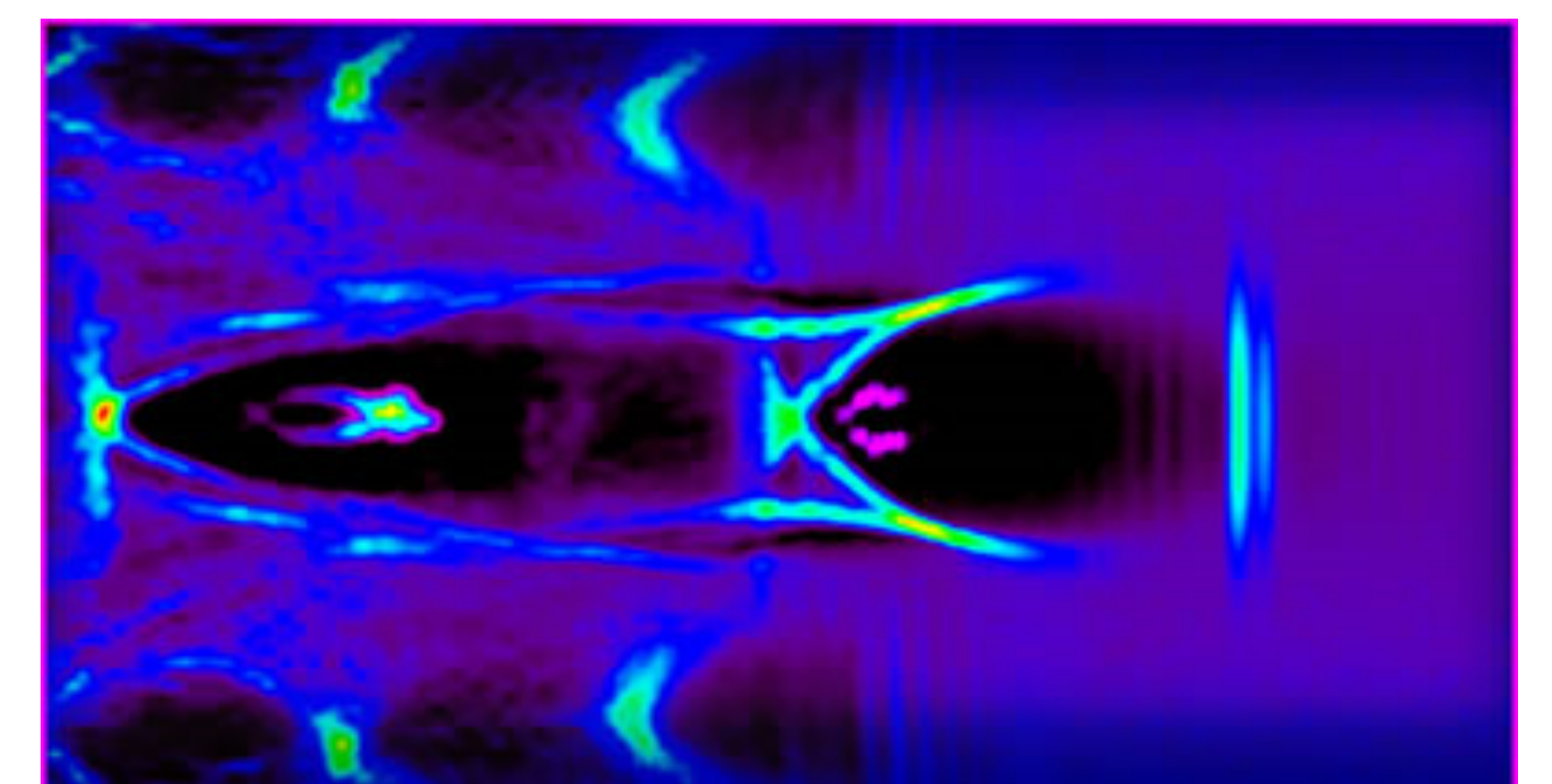
With accelerator physics often not contained in the curriculum of universities DESY staff tries to fill this void. Since the start of the Terascale Alliance a combined lecture and exercise course (2h each) has been offered at the University of Göttingen. The course has been well accepted by interested student and so far led to a Bachelor and Master thesis in accelerator science.

In fact, the promotion of accelerator physics at the Terascale has furthered the exchange of students between institutions. Students from Bonn and Mainz have begun their PhD thesis at DESY/ University of Hamburg and students of Hamburg University have started their Diploma work at CERN, jointly supervised by CERN staff and professors of Hamburg University.

Preparation of Study of Novel Acceleration Techniques

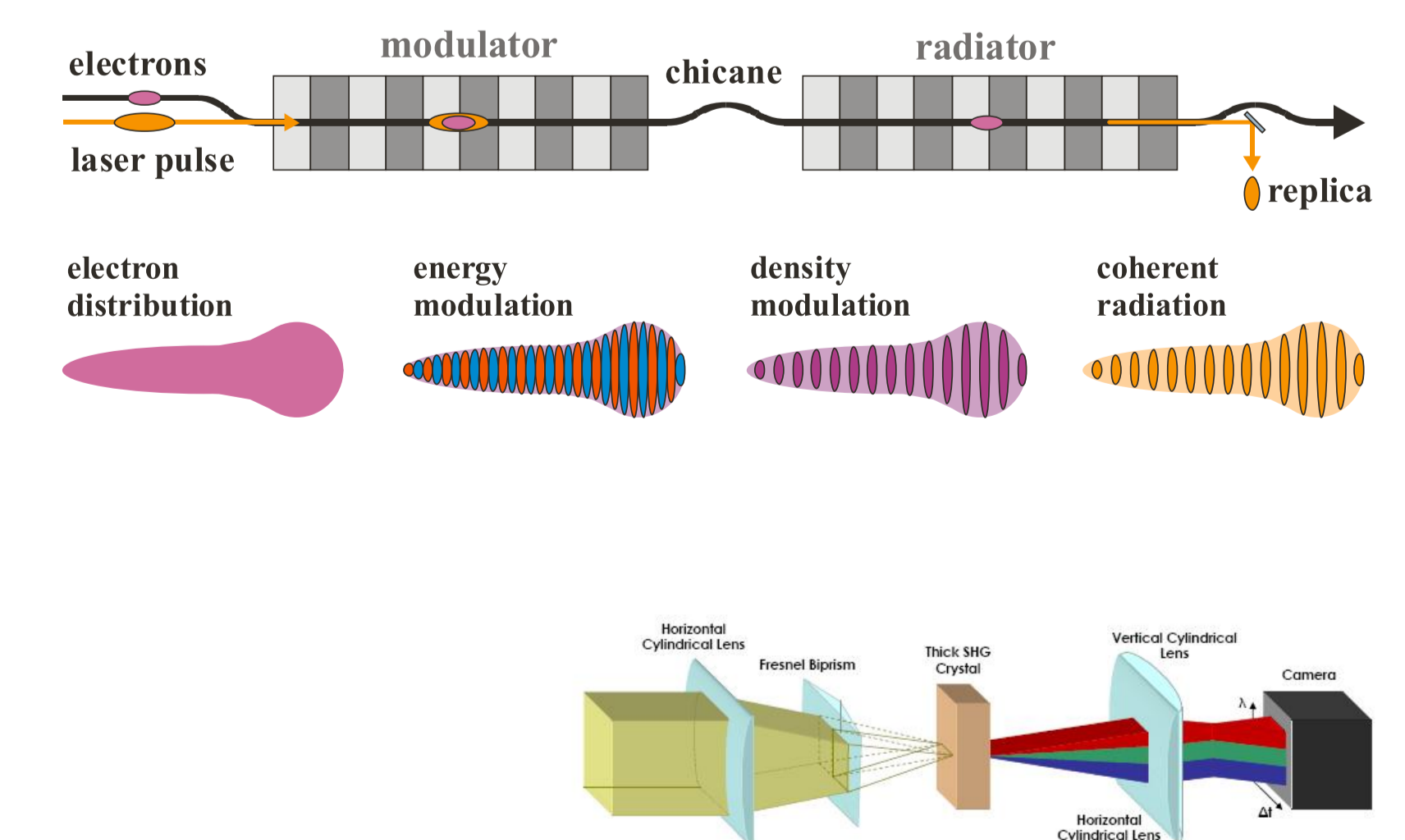
For the next leap in energy accelerating gradients above 1 GV/m have to be mastered. Currently no concept for an accelerator capable of reaching far into the Terascale is available.

Recently several experiments have been carried out that use a plasma to accelerate electrons with electric fields exceeding 1 GV/m. Such plasmas can be excited by high power lasers or short particle bunches. Institutes of the Terascale Alliance are prepared to explore some aspects of these developments. The Young Investigator Group for Accelerator Physics is currently being installed at Hamburg University.



Laser induced Plasma Acceleration (source LBNL)

The optical replica of an electron bunch can be analysed by optical FROG techniques and could be used to resolve the temporal structure of short electron bunches. This technique, currently explored at FLASH/DESY, is of interest to novel accelerators.



Optical Replica Synthesizer (ORS) at FLASH.