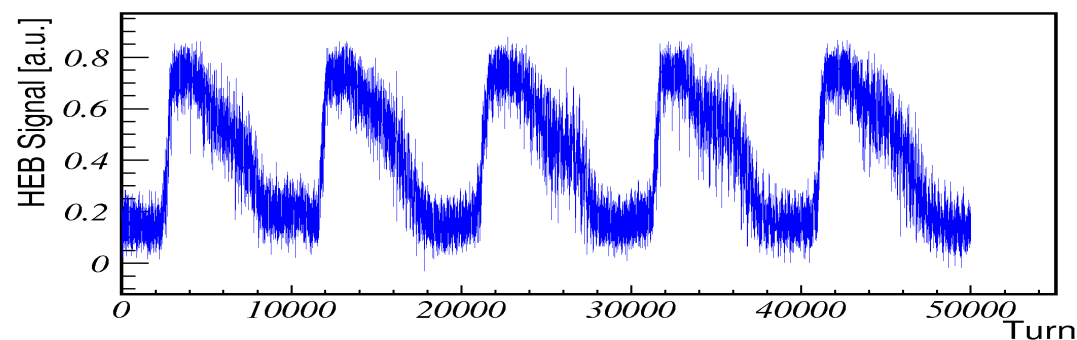
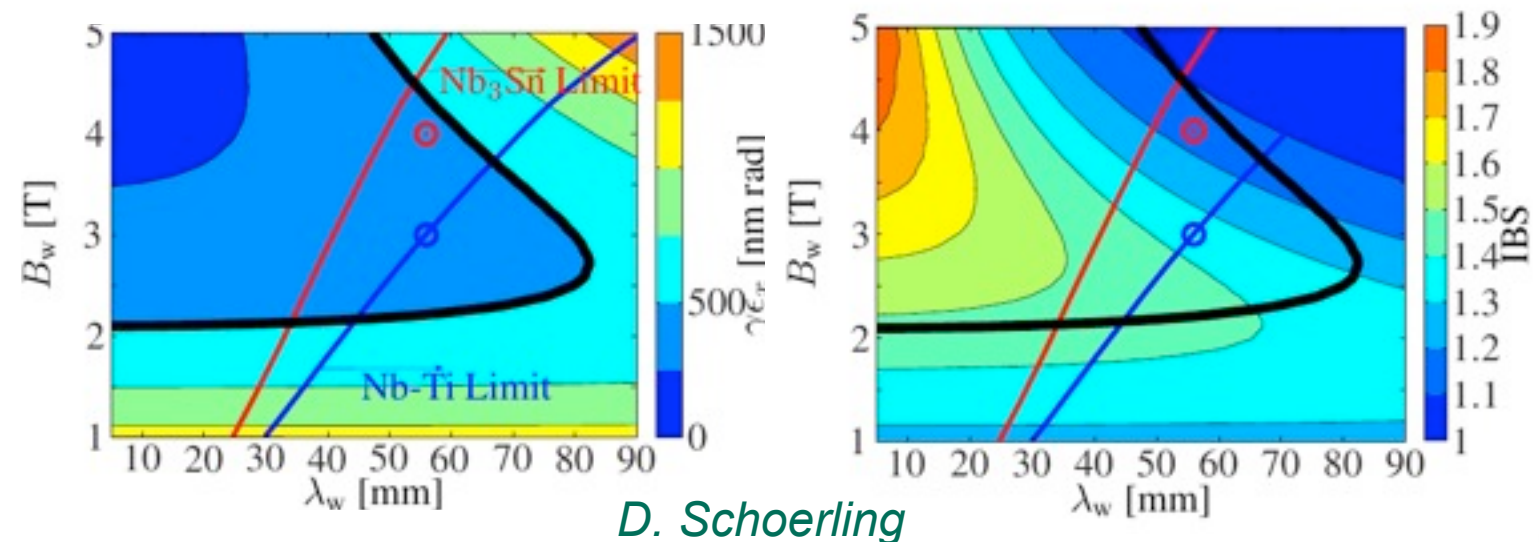


EP-3

Günther Müller

Physik & Technologie von Dämpfungsringen

- **Partnerinstitute:** CERN, KIT-Universitätsbereich (LAS), ???
- **Kontext:** CLIC / ILC - Strahldynamik, e- γ -WW, R&D supraleitende IDs
- **Ziel:** Vertiefung des Verständnisses der Physik der DR
- Experimentelle Tests an CLIC-Dämpfungswiggler-Prototypen in ANKA
 - strahldynamische Experimente & Entwicklung von Instrumentierung geeigneter Auflösung
- Strahldynamik & e- γ -WW
 - CSR in Dämpfungsringen
 - Simulationen mit realistischen Wiggler-Feldmodellen
 - (De-)Polarisationsstudien



V. Judin

- Methodenentwicklung
 - Teilchen-Tracking durch Wigglerfelder
 - Schnittstellen zw. B-Simulationen, Strahlungsfeldberechnung und Tracking

Spin Management polarisierter Leptonstrahlen an Beschleunigern

(Gruppen: Aulenbacher, Hillert, List, Moortgat-Pick, Riemann)

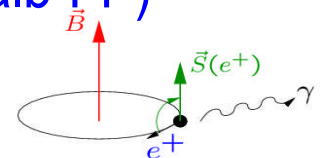
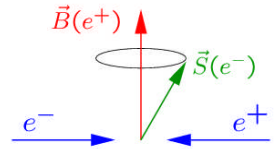
● Forschungsschwerpunkte:

- generische 'Spin-Arbeit': polarisierte Quellen/Target (MP,R), spin tracking: Source, Linac, Rotatoren, Damping Ring, BDS (H,L,MP,R), Software Erarbeitung (L,R,MP), beam-beam Effekte/strong fields (MP), Polarimetry (A,L), Matching: Theorie Anforderungen+Experimente (L,MP)
- Anwendung auf detailgetreue Designs e.g. ILC&CLIC (H,L,MP,R)
- Test : Target Prototype Experimente (A,R), Polarimeter Prototypes (A,L)

● Kollaboration mit Forschungszentren: DESY, Hamburg & Zeuthen

● Laufender Antrag: 1.7.2009-30.6.2011 (Nachantrag außerhalb FP)

● Neuantrag: ab 1.7.2012-30.6.2015



Investigation & reduction of field emission from Cu surfaces

Motivation and research status

- FE is the origin of **rf breakdown** in actual nc X-band structures for linear colliders of TeV electron energy (e.g. CLIC) with required accel. gradient of ~ 100 MV/m
- Achievable gradient (maximum surface field) of such structures varies between $E_{\text{acc}} = 40\text{-}120$ MV/m ($E_s = 100\text{-}300$ MV/m)
- DC-FE microscopy and correlated SEM of Cu samples revealed **particulates** and **surface irregularities** as origin of emitters
- Dry-ice cleaning of Cu rf gun cavities at DESY provided much reduced FE and higher operating field levels (60 MV/m)
- Average **surface roughness** influences the local field enhancement of defects and FE onset as shown for Nb samples

Objectives and future tasks

- Systematic correlated FESM/SEM/EDX investigations on Cu samples actually prepared at CERN or SLAC as quality control and test of **new procedures** (DIC)
- Comparative surface roughness studies on initial and **rf-processed Cu** samples cut from actual accelerating structures
- Improved understanding and reduction of FE from optimized Cu surfaces for reliable achievement of high gradients

Requested BMBF funding

- 3 MY à 50 % TVL13 for a PhD student
- 20 TEURO for upgrade of equipment (DIC-cleaning gun in clean room, etc.)
- 5 TEURO for undergraduates
- 20 TEuro for travel and consumables

