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Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme
Fachbereich Physik, Universität Stuttgart

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Login data will be announced by e-mail and on the colloquium webpage.

Dienstag, 19. Januar 2021 | **16.15 Uhr** | **Online-Vortrag**

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Gastgeber: Prof. Gisela Schütz, Max-Planck-Institut für Intelligente Systeme, Telefon: 0711 689-1950

EPR-on-a-Chip: A revolution in spin-based analytics?

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Abstract

Electron paramagnetic resonance spectroscopy (EPR) provides information about chemical and physical properties by using spins unpaired electrons as highly specific nanoscopic probes, e.g. chemical radicals or defects in semiconductors. This allows very fast and efficient quantification and identification of physical, chemical and biological substances with respect to their radical concentration and origin. Unfortunately, the EPR spectrometers currently available on the market are bulky and not well suited for mobile or operando experiments. HZB and the University of Stuttgart are currently developing a new concept that allows the entire spectrometer to be integrated on a battery-powered silicon chip only a few square millimeters in size (EPR-on-a-Chip, EPRoC). EPRoC can be integrated into the sample or its environment (human body, water, chemical reactors, UHV…) to measure operando or in vivo spin concentrations. This opens up radically new applications in medicine, environmental diagnostics, food chemistry, process control as well as material and fundamental research. In this talk I will critically review the current status of the EPRoC development and give first application examples, such as an EPR dipstick or sensing defect complex in silicon solar cells.