Love Wave Surface Acoustic Wave Magnetic Field Sensors (invited)

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Acoustic wave sensors have proven to be powerful devices for the detection and quantification of different physical parameters. Love-wave sensors as a special type of surface acoustic wave (SAW) sensors use shear horizontal waves guided in a layer on the surface of the sensor which increases the surface sensitivity for the quantities to be measured at this surface.

The principle of the magnetic field sensor is based on the change of the elastic properties of magnetostrictive materials in magnetic fields, the so-called ΔE effect. The Love wave SAW sensor uses shear horizontal acoustic surface waves that are guided by a fused silica layer with an amorphous magnetostrictive single or multilayer film on top. The velocity of these waves follows the magnetoelastically-induced changes of the shear modulus according to the magnetic field present. The SAW sensor is operated in a delay line configuration and translates the magnetic field to a related phase shift.

In my talk, I will present the general characteristics of Love Wave SAW sensors and their fabrication, and discuss their characteristics as magnetic field sensors.