Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, February 5-th, 2008

(16:00 in Room 459/30b)

Ground Penetrating Radar for the Detection
of Buried Nonmetallic Anti–Personnel Landmines

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Abstract

Anti-Personnel (AP) landmines are considered as a problem of global proportions and it is estimated that about 60-70 million AP landmines are scattered within at least 70 countries all over the world. Many of the mines are made without metal so that detection methods based on electromagnetic induction (EMI) often tend to fail. One of the promising concepts for the detection of buried nonmetallic objects is the ground penetrating radar (GPR) which originates from geophysical techniques.

The results of the investigations which will be presented cover different important aspects of GPR. The important problem of focusing the raw image data of a GPR measurement will be addressed. The analytical derivation of the so-called Synthetic Aperture Radar (SAR) focusing algorithm will be discussed and verified. Moreover, different theoretical and practical limitations of the SAR focusing for GPR will be discussed using both, analytical and numerical simulation techniques.

Moreover, the results of several GPR measurements will be presented in order to discuss different aspects of the practical application of GPR. Two prototype GPR systems have been designed, constructed and verified experimentally, namely, an automated laboratory GPR and a mobile GPR setup for outdoor measurements.

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