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A novel method to measure 3 components of magnetic fields with submicron resolution using Scanning Hall Probe Microscopy/Gradiometry AHMET ORAL, Sabanci University, MUNIR DEDE, RIZWAN AKRAM, Bilkent University, SABANCI TEAM, BILKENT TEAM — We present the development of a new 4-lead hall gradiometer and a novel method to measure 3 components(Bx, By & Bz) of magnetic fields on specimen surfaces with submicron resolution using Scanning Hall probe Microscope[1] and gradiometer. We used a 1μm size P-HEMT Hall sensor, operated in gradiometer configuration to image Bx, By and Bz distribution of a hard disk sample surface at 77K. The SHPM was used in Quartz Crystal AFM tracking mode[2]. This simple and quick novel method shows $\sim$40 better spatial resolution compared to previously developed techniques[3] and can be improved even further, down to sub 50nm resolution. 1. Chang, A.M., et al., *Scanning Hall Probe Microscopy.* Applied Physics Letters, 1992. **61**(16): p. 1974-1976. 2. Dede, M., et al., *Scanning Hall Probe Microscopy (SHPM) using quartz crystal AFM feedback.* Journal of Nanoscience and Nanotechnology, 2008. **8**(2): p. 619-622. 3. Gregusova, D., et al., *Fabrication of a vector Hall sensor for magnetic microscopy.* Applied Physics Letters, 2003. **82**(21): p. 3704-3706.

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