

Development of an Ultra-Small-Scale Gravitational Wave Detector

Masaki Ando[1]; Takeshi Takashima[2]; Shigenori Moriwaki[3]; Koji Ishidoshiro[4]; Wataru Kokuyama[5]; Akito Araya[6]; Yoichi Aso[7]; Motohide Kokubun[2]; Hirokazu Odaka[8]; Takayuki Yuasa[9]; Takehiko Ishikawa[2]; Teruaki Enoto[10]; Shuichi Sato[11]; Akiteru Takamori[12]; Ayako Matsuoka[2]

[1] Dept. of Physics, Univ. of Tokyo; [2] ISAS/JAXA; [3] Material Science, Univ. Tokyo; [4] Physics, Univ of Tokyo; [5] Physics, U.Tokyo; [6] ERI, Univ. Tokyo; [7] Columbia Univ.; [8] Physics, Univ. of Tokyo; [9] Department of Physics, Univ. of Tokyo; [10] Physics, Tokyo Univ.; [11] NAOJ; [12] Earthq. Res. Inst., Univ. Tokyo

SWIM (SpaceWire Interface demonstration Module) is a small, multi-purpose processing unit with SpaceWire communication standard. SWIM is being developed for launch scheduled in summer of 2008. One of the purpose of SWIM is to demonstrate communication between multiple modules with SpaceWire, which is a next-generation communication standard to be used in future spacecraft.

In this talk, we will present the current status of an ultra-small-scale gravitational wave detector, called SWIM_munu, which will be included in SWIM as one of SpaceWire demonstration modules. SWIM_munu is comprised of two 80x80x80 mm modules. Each module has a small (weight: 50g, size: 50x20x20 mm) test mass inside it, motion of which is monitored with photo-sensors in 6 degrees of freedom. The output of photo-sensors are processed with a FPGA and fed back to the mass actuator so as to keep the test mass in the module. Two test masses are placed in a orthogonal direction to each other. In this arrangement, their differential rotation would be caused by tidal forces of gravitational waves.