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Development of a next generation short range gravity experiment NEWTON-V, using digital microscope SHUNTARO SAIBA, HIROAKI ANDO, MIREI HATORI, SHOKI INABA, KAZUFUMI NINOMIYA, TOMOMI SAKUTA, NATSUMI SHINOZAKI, JIRO MURATA, Rikkyo University, NEWTON COLLABORATION — According to a large extra dimensional model, a deviation from Newton's inverse square law is expected at sub-millimeter range. Current NEWTON-IVh project aims to test the inverse-square law at millimeter scale, using a torsion pendulum. In order to examine the gravitational force at around micrometer distances, we are developing the new apparatus NEWTON-V, using a digital microscope. This experiment is going to measure gravity between two wires of around 10 to 100 micrometer, which are separated by distances in the range of 100 micrometer. One wire is used as a cantilever for the force sensing, which motion is measured by a pico-precision displacement sensor. This method was originally developed for the micron precision optical alignment system (OASys) for the PHENIX muon tracking chambers at RHIC, using digital image analysis technique. In this presentation, development status and preliminary results will be reported.

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