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ROMY – The First Large 3D Ring Laser Structure for Seismology and Geodesy

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Large ring laser gyroscopes have matured to the point that they can routinely observe rotational motions from geophysical processes that can be used in geodesy and seismology. The ring lasers used for this purpose enclose areas between 16 and 800 square meters and have in common that they can only measure rotations around the vertical axis because the structures are horizontally placed on the floor. With the ROMY project we have embarked on the construction of a full 3-dimensional rotation sensor. The actual apparatus consists of four individual triangular ring lasers arranged in the shape of a tetrahedron with 12 m of length on each side. At each corner of the tetrahedron three of the ring lasers are rigidly tied together to the same mechanical reference. The overall size of the installation provides a promising compromise between sensor stability on one side and sensor resolution on the other side. This talk introduces the technical concept of the ROMY ring laser installation and will also briefly outline the requirements for applications in space geodesy.