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The GIOTTO Project - Building Monitoring with 6DoF Sensors

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Characterizing earthquake induced building damage in an efficient, automated and non-invasive way is a crucial support for the decision on further usability of critical infrastructure. In the GIOTTO project (Gebäudeerschwingungen: kombinierte Zustandsanalyse mit innovativem Sensorkonzept) we propose to use 6 degrees of freedom sensors (6DoF) to monitor the complete movement of a building structure in three rotational and three translational degrees of freedom. On one side, we develop 6DoF sensor networks for strong motion building monitoring on the basis of 20 inertial measurement units (IMU50 by iXblue, France) originally designed as north-finding gyroscopes, on the other side we incorporate the new observable of rotational ground motions into the concept of coda wave interferometry for continuous real-time structural health monitoring. In this contribution we show first results (1) from laboratory experiments for sensor performance characterization as well as (2) from a 6DoF active source experiment at a horizontal 24 m long concrete beam (the BLEIB test structure hosted by the Bundesanstalt für Materialforschung und -prüfung, south of Berlin, Germany).