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Multi-Channel Interferometry between Spheres for Trilateration

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1) Title of Abstract: **Multi-Channel Interferometry between Spheres for Trilateration**

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4) Abstract: This paper presents an initial design of a highly innovative measurement technique referred to as Multi-Channel Interferometry between Spheres for Trilateration (MIST). Analytical and experimental results are presented, and concepts are described for embedding this technology within production tooling and machines. MIST involves using absolute distance interferometry to directly measure the distance between two steel spheres, a large portion of which would remain accessible as reference datums, while shielding the laser path from environmental disturbances. As a single scale bar this could provide highly accurate scale information to be used for instrument verification or network measurement scaling. Since spheres can be simultaneously measured from multiple directions it also allows highly accurate multilateration based coordinate measurements to act as a large scale datum structure for localized measurements, or to be integrated within assembly tooling, coordinate measurement machines or robotic machinery.