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**High Resolution Micro-Optical Wall Shear Stress Sensor Based on Whispering Gallery Modes of Dielectric Microspheres** ULAS AYAZ, TINDARO IOPPOLO, VOLKAN OTUGEN, Southern Methodist University — We report the performance of a photonic wall shear stress sensor based on Whispering gallery mode (WGM) shifts of dielectric microsphere resonators. In particular, issues related to the sensitivity, resolution, frequency response and cross-axis sensitivity of the sensor are investigated experimentally. The sensor used in this prototype is a dielectric hollow microsphere made of Polydimethylsiloxane (PDMS). The wall shear stress acting on a sensing element of  $125\ \mu\text{m}$  diameter, is transmitted mechanically to the microsphere and the transmitted stress leads to shifts in the WGMs of the microsphere. By monitoring these WGM shifts, the magnitude as well as the direction of the wall shear stress are measured. Measurement resolutions better than 1 mPa have been observed.

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