ANYTHING BUT TWO MIRRORS: CRD IN WAVEGUIDE CAVITIES.

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Phase-shift CRD measurements were used to determine the optical loss in a variety of unusual optical cavities. Cavities were made of
– loops of optical fibers,
– circular channels containing a high refractive index liquid,
– strands of single-mode fiber using Bragg gratings as mirrors,
– microresonator spheres made from silica and polydimethyl siloxane and,
– silicon-on-insulator "race track" microresonators.
These cavities were interfaced to (micro-)analytical separation systems such as microfluidic labs-on-a-chip, capillary electrophoresis and high-performance liquid chromatography (HPLC). As the sample interacts with the cavity, the ring-down time is decreased and absorption detection of small liquid samples is possible. CRD measurements in waveguide cavities may also be extended to very sensitive refractive index measurements. By exploiting the response of long-period gratings and microresonators to refractive index changes, ppb-level chemical detection was carried out in water and air.