Strong Coupling of Multimolecular Species to *Soft Microcavities*

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S1 Experimental setup

Figure S1: Schematic showing the experimental setup

Figure S1 shows a schematic of the experimental setup used to probe dark-field scattering from an individual microsphere placed on a glass substrate. The microsphere was excited in evanescent configuration through the dove prism. The scattered light was collected through a 0.8NA, 100x objective lens. Lens L2 and L3 form the telescope configuration and L4 projects the image plane to the spectrometer or to the camera depending on the position of the mirror M2. Adjustable pinhole was placed at the conjugate image plane to spatially filter scattering from an individual microsphere.

S2 Hopfield coefficients

To further understand the molecule-cavity coupling, we analyze the mixing fractions (Hopfield coefficients). Figure S2 shows the calculated mixing fractions for the molecule-cavity system. For TE\textsubscript{17,1} and TE\textsubscript{15,1}, it is easy to understand as there is no inter-molecular coupling between PDAC/TDBC and S2275 molecules through the WGM resonance. However, the interesting case is TE\textsubscript{16,1} mode. Here we see that there is an inter-molecular coupling through the WGM resonance resulting in upper, middle, and the lower polariton branches.
Figure S2: (a) and (b) are calculated Hopfield coefficients for the upper and lower polaritons generated due to the splitting of the WGM TE$_{17,1}$. (b), (d), (e) are the Hopfield coefficients for the upper, middle, and lower polaritons generated to the splitting of the WGM TE$_{16,1}$. (f) and (g) are calculated Hopfield coefficients for the upper and lower polaritons generated due to the splitting of the WGM TE$_{15,1}$. 