

Stimulated Raman Loss Spectroscopy : Collinear vs Non-collinear beam geometries

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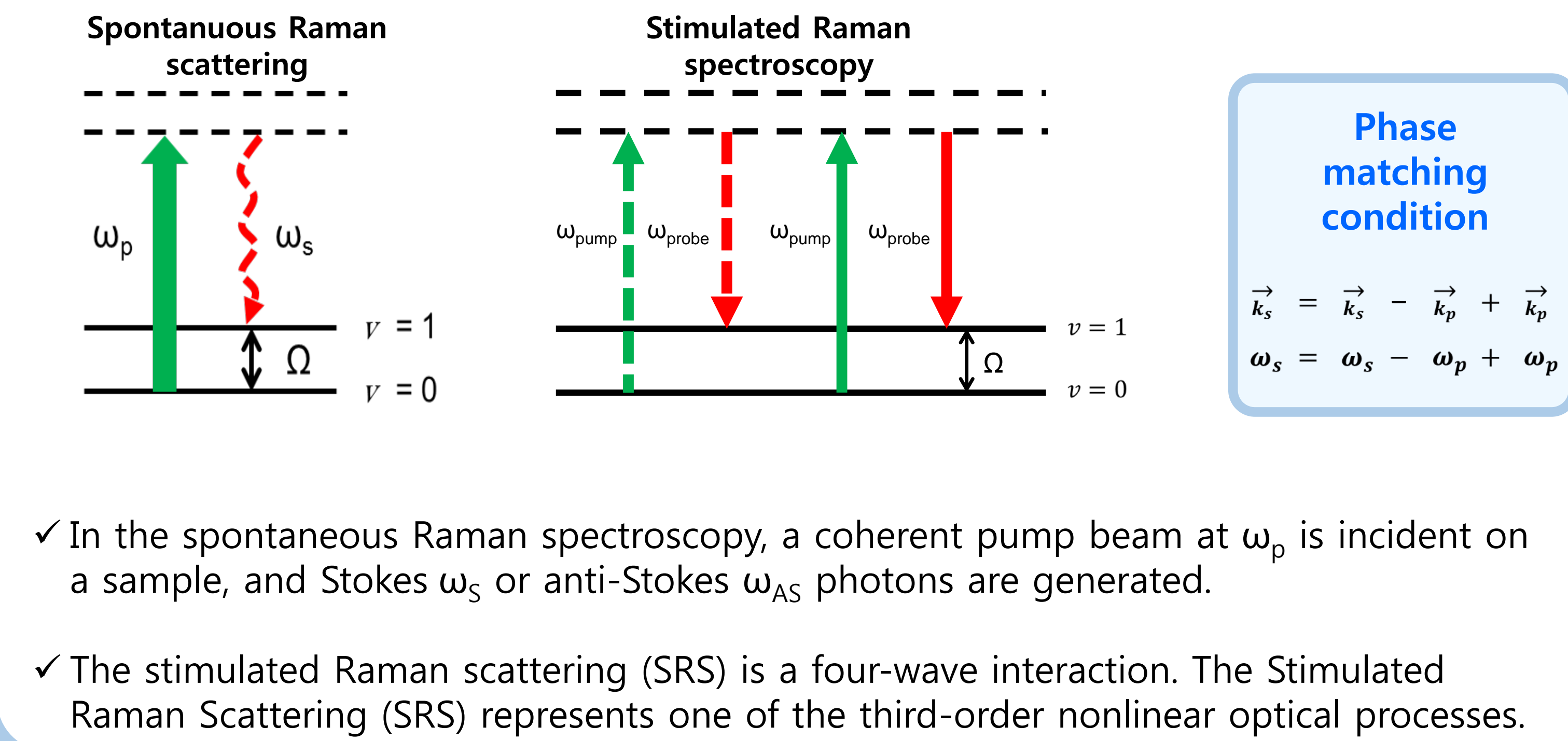
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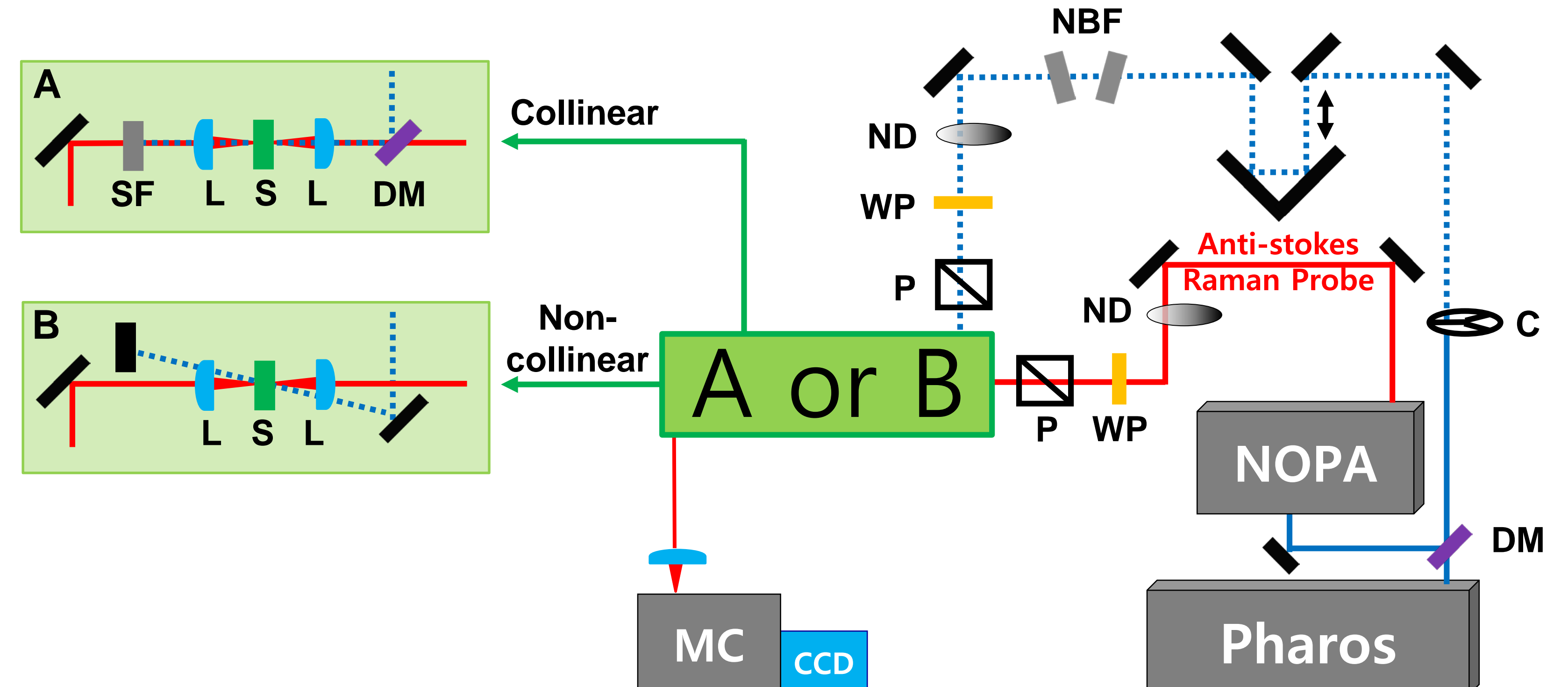
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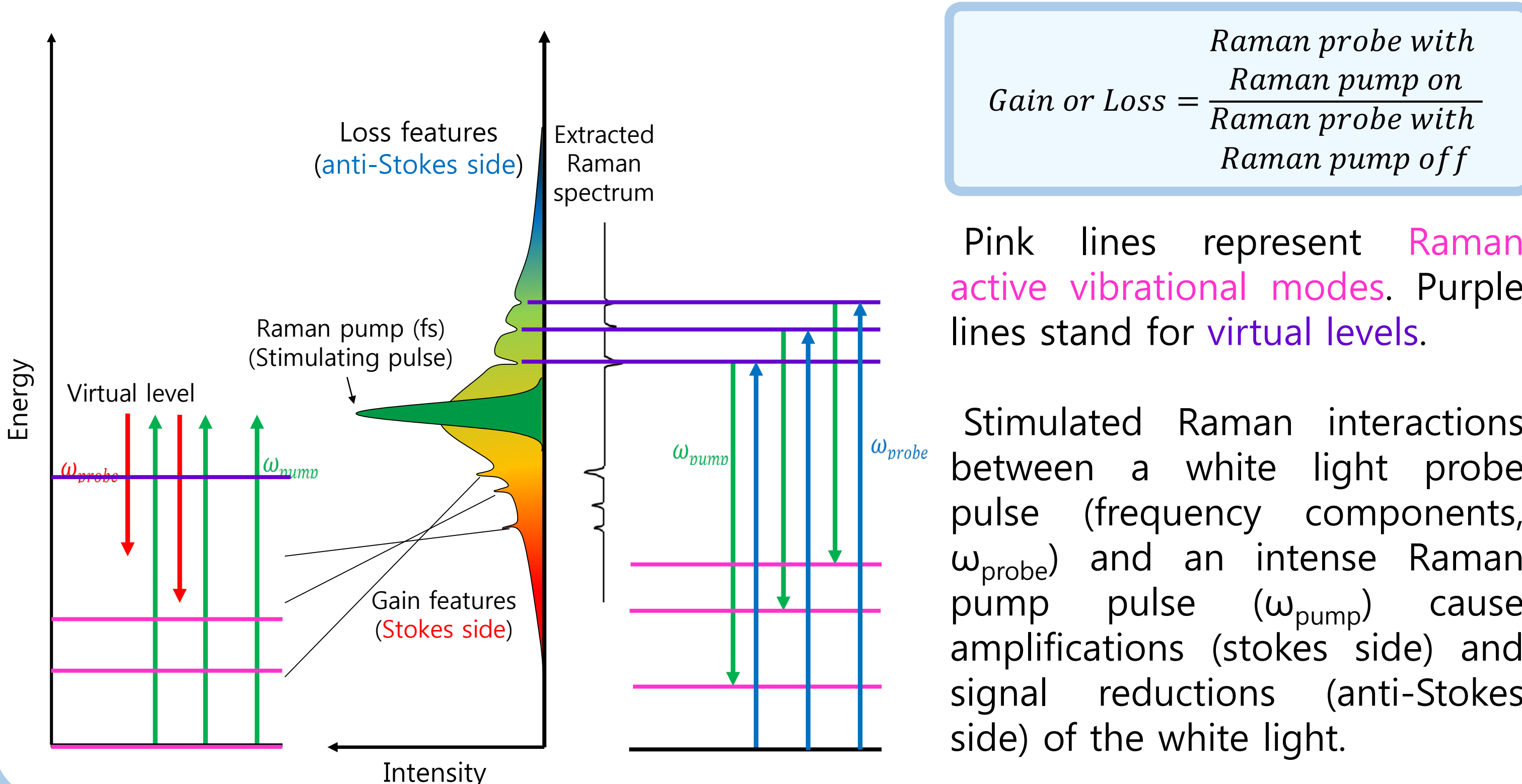
❖ Vibrational spectroscopy by Raman scattering process



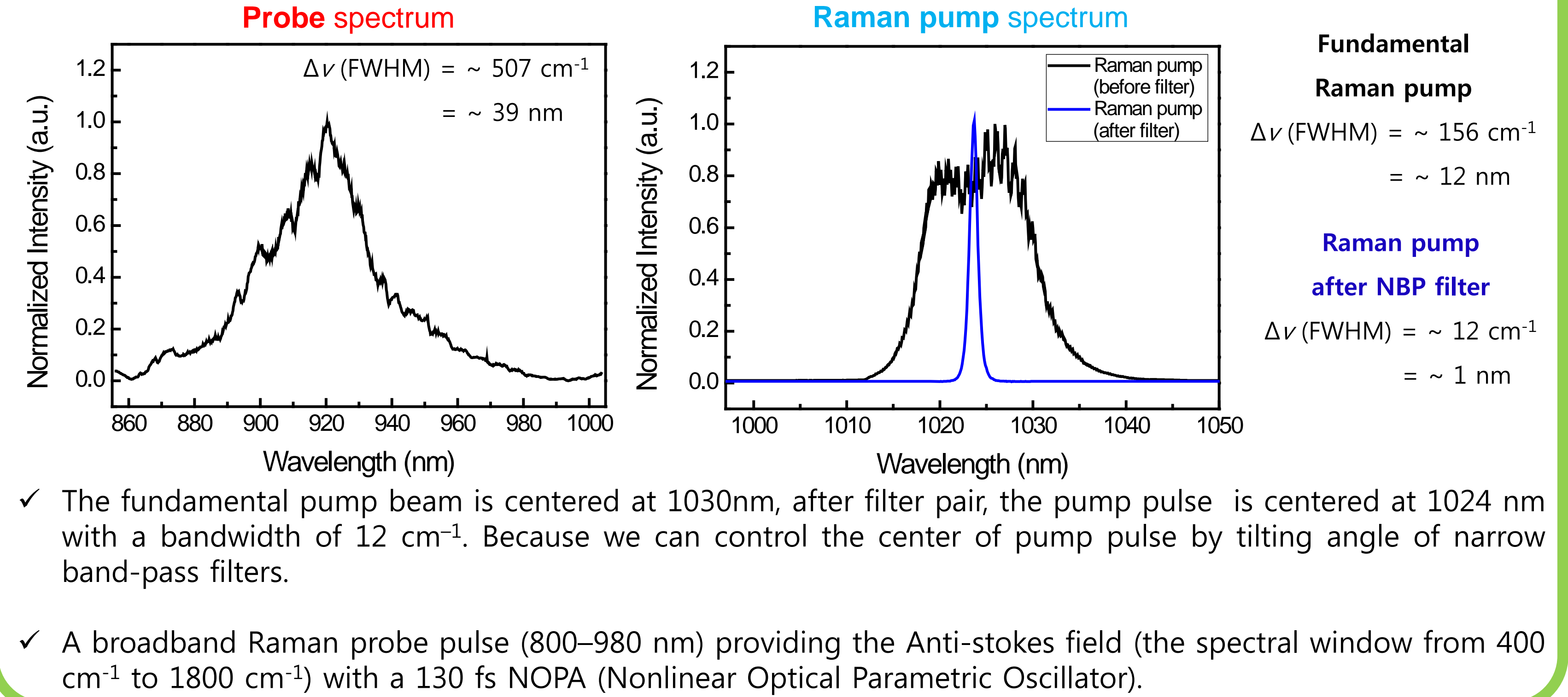
❖ Layout of the stimulated Raman spectrum measurement system



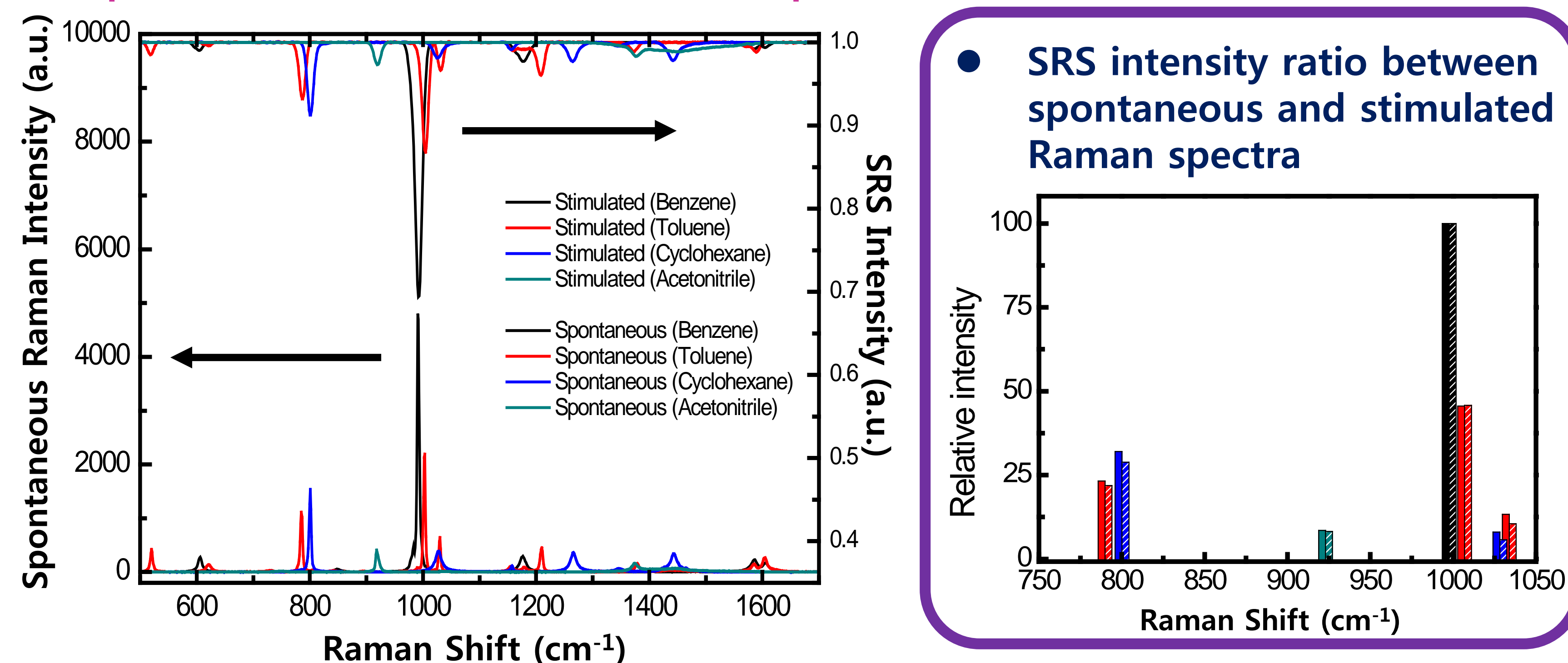
❖ Stimulated Raman Scattering (SRS) energy diagram



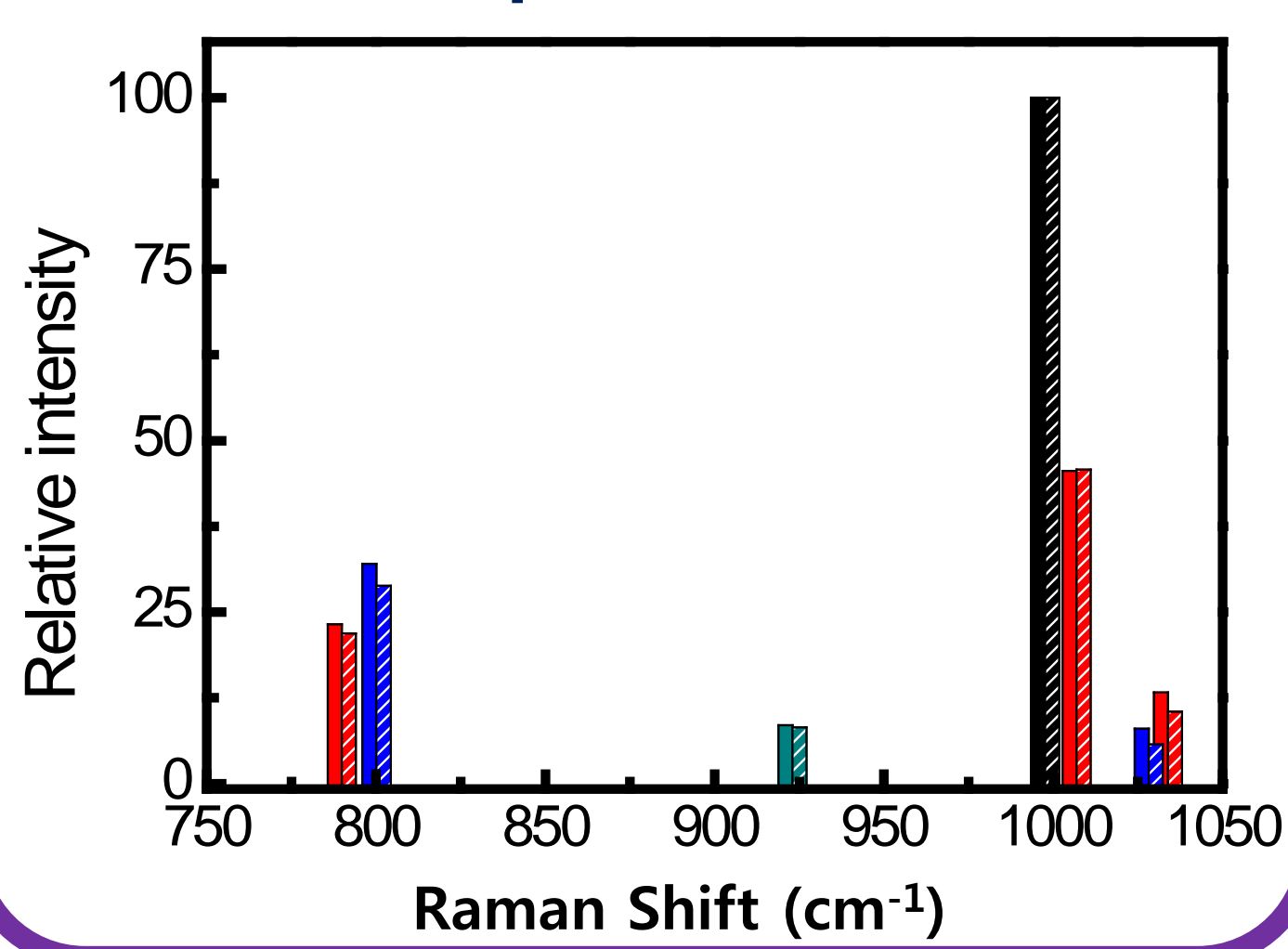
• Raman pump and Raman probe spectra



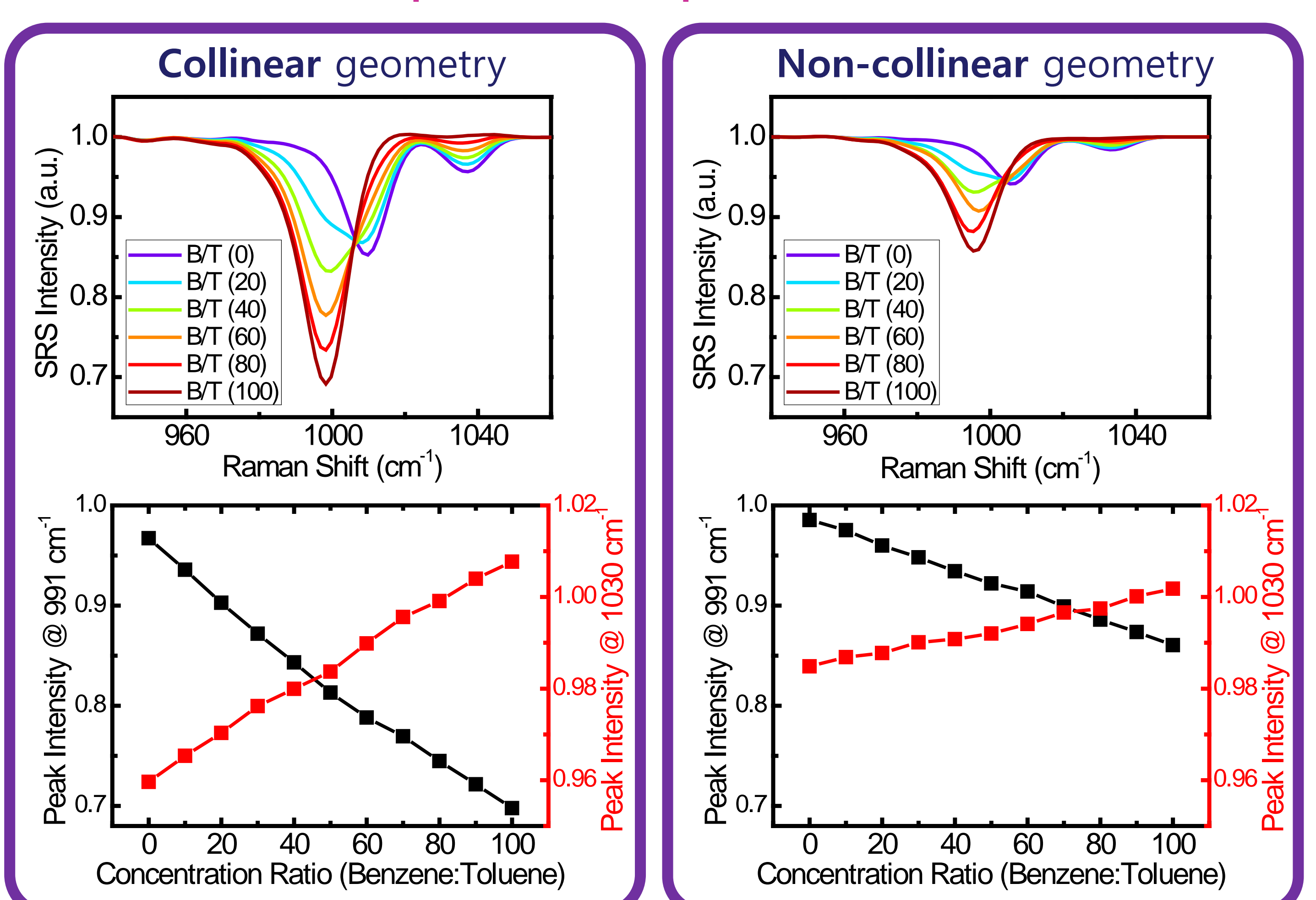
• Spontaneous and Stimulated Raman spectra



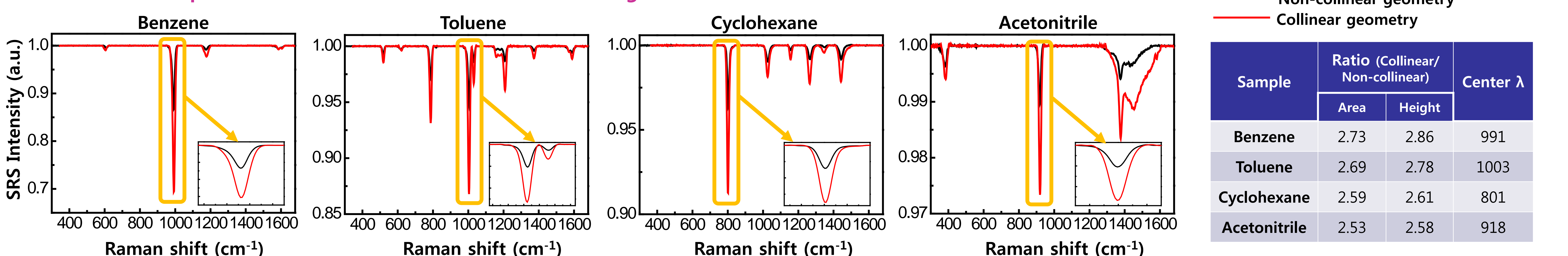
• SRS intensity ratio between spontaneous and stimulated Raman spectra



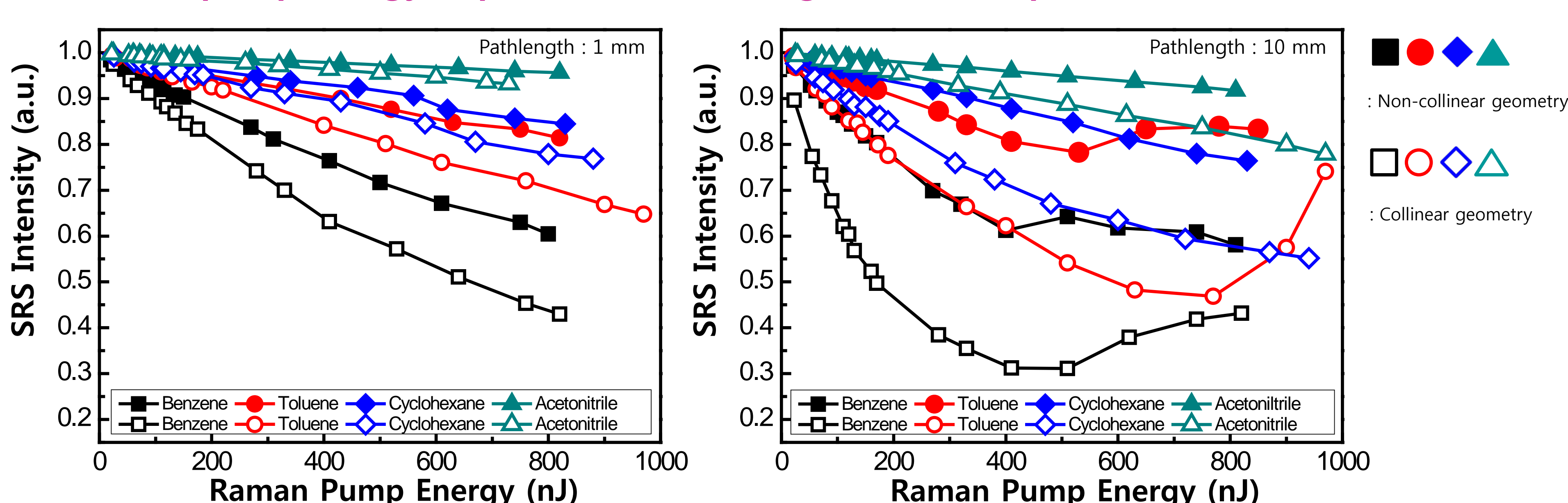
• Concentration dependent SRS spectra Benzene and Toluene



• Different SRL spectra between Non-collinear and Collinear geometries



• Raman-pump energy dependence of SRS signal of 4 samples



• Conclusion

- ✓ From the concentration dependence of mixture, we expect that **SRS spectroscopy method is possible to do quantitative experiment**.
- ✓ The power dependence of various molecules exhibits the quantitatively expected results in that **it showed a linear intensity growth**.
- ✓ However, at Raman pump powers above 400 nJ and 10 mm pathlength, the SRL spectra changes dramatically. The results were inconclusive and difficult to interpret because **the SRL spectra includes unpredictable pump-induced Optical Kerr Effect (OKE) or any other non-resonant contributions**.
- ✓ The SRS intensity using **collinear geometry** is **~2.6 times greater** than the SRL intensity using non-collinear geometry. Therefore, we can recommend this geometrical method for biological imaging.