

*X-ARAPUCA Photon Collection: **WLS material properties at cold***

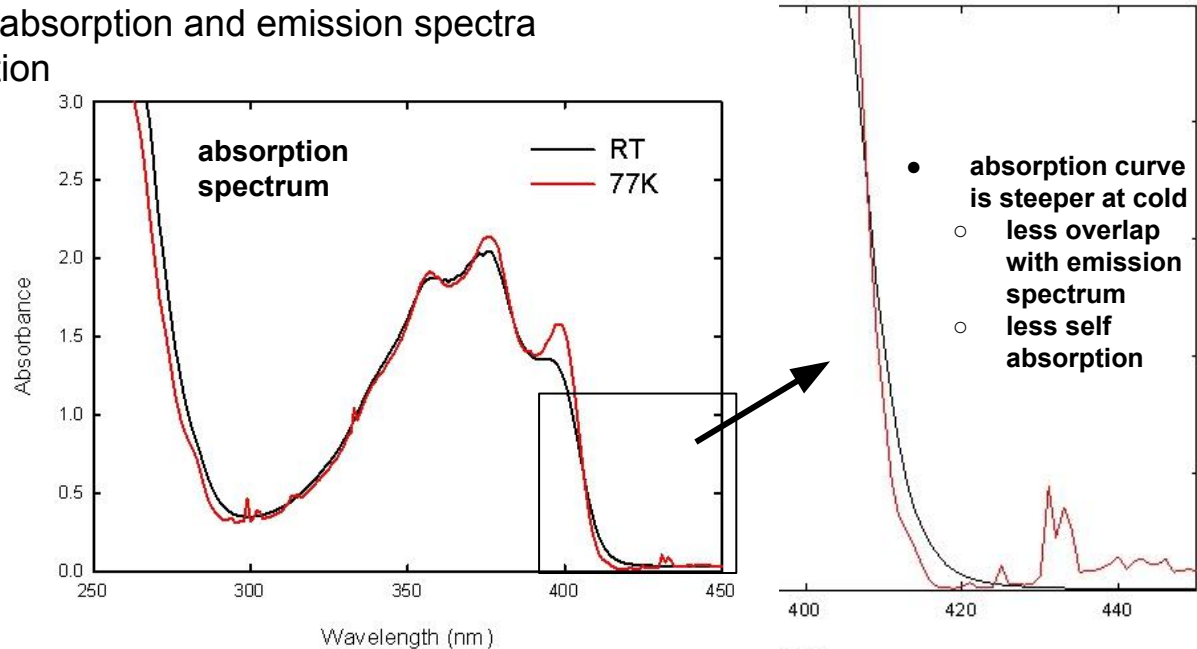
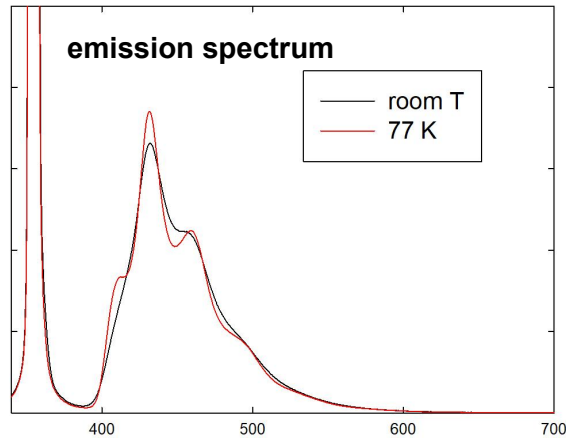
C. Brizzolari, L. Meazza, C. Cattadori, F. Bruni
on behalf of the WG
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WLS material properties

- The light trapping process relies on the overlapping of the emission and absorption spectra of the WLS materials
- WLS process in G4 requires 2 spectra:
 - mean absorption length spectrum
 - emission spectrum
- these spectra have a dependence on temperature
 - In my simulation I used:
 - pTP dissolved in cicloexane spectra (probably at 300K)
 - WLS light guide spectra measured at G2P at 300K
- To model the light entering the XArapuca, WLS material properties should be characterized at cold
 - relevant for the light guide chromophore concentration optimization

G2P WLS (BBT) light guide properties at cold

- preliminary measurements from MiB ScMat
 - in september a better setup will allow proper measurements at cold
- at cold, spectra get “more resolved”
 - less overlap between absorption and emission spectra
 - likely less self absorption



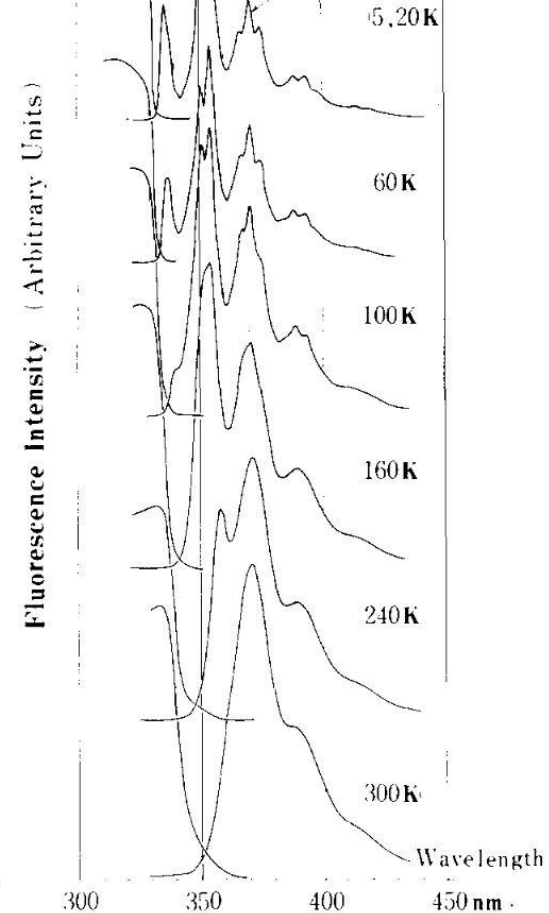
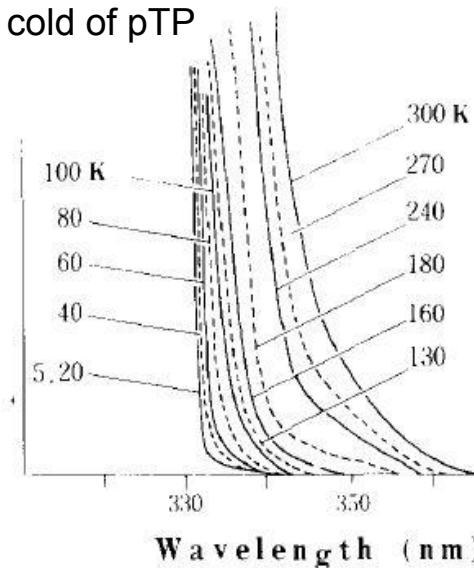
pTP properties at cold

- Decreasing temperature:
 - emission peaks get narrower
 - higher energy peaks grow while lower energy ones decrease
- This is from: [https://doi.org/10.1016/0022-2313\(82\)90008-4](https://doi.org/10.1016/0022-2313(82)90008-4)
 - MiB ScMat is planning a measure at cold of pTP evaporated on glass to check this

FLUORESCENCE AND PHASE TRANSITION OF p-TERPHENYL CRYSTAL

Nobuko I. WAKAYAMA

National Chemical Laboratory for Industry, Tsukuba Research Center, Yatabe, Ibaraki 305, Japan



pTP properties at cold

- If pTP is dissolved in a matrix the emission spectrum is shifted towards higher energy
 - the spectrum I used was for pTP in cyclohexane at RT
 - PL onset at 300nm

