



	<b>Experiment title:</b> A first X-ray diffraction study of the liquid-crystal order in an all-aromatic mesogen, 2,6-diphenyl naphthalene.	<b>Experiment number:</b> 26-02-618
<b>Beamline:</b> BM26B	<b>Date of experiment:</b> from: 28 November 2012 to: 03 December 2012	<b>Date of report:</b> 26 February 2016
<b>Shifts:</b> 9	<b>Local contact(s):</b> Giuseppe Portale	<i>Received at ESRF:</i>

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**Report:**

The experimental results have been published in the paper

F. Vita, M. Hegde, G. Portale, W. Bras, C. Ferrero, E. T. Samulski, O. Francescangeli and T. Dingemans, "Molecular ordering in the high-temperature nematic phase of an all-aromatic liquid crystal", *Soft Matter* **12**, 2309-2314 (2016),

whose abstract is reported below

*We report the structural characterization of the nematic phase of 2,6-biphenyl naphthalene (PPNPP). This lath-like all-aromatic mesogen provides a valuable benchmark for classical theories of nematic order. PPNPP exhibits a very high temperature nematic phase (417–489 K) above an enantiotropic smectic A phase. X-ray diffraction reveals a surprisingly strong tendency towards molecular layering in the nematic phase, indicative of "normal cybotaxis" (i.e. SmA-like stratification within clusters of mesogens). Although stronger at low temperatures, the layering is evident well above the smectic A-nematic transition. The nematic order parameter is evaluated as a function of temperature from the broadening of the wide-angle diffuse diffraction feature. Measured values of the orientational order parameter are slightly larger than those predicted by the Maier–Saupe theory over the entire nematic*

*range except for a narrow region just below the clearing point where they significantly drop below the theoretical prediction.*