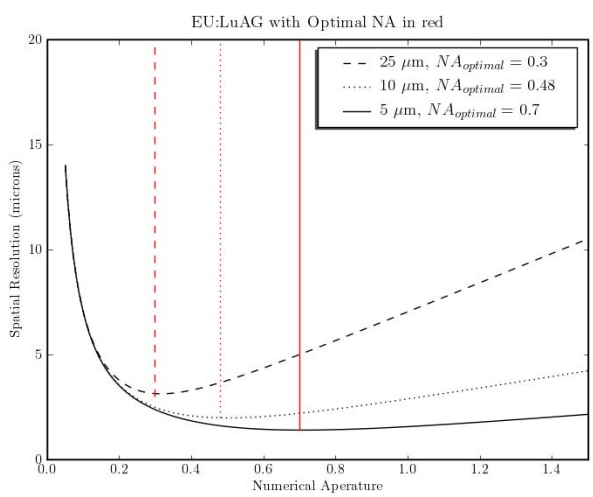
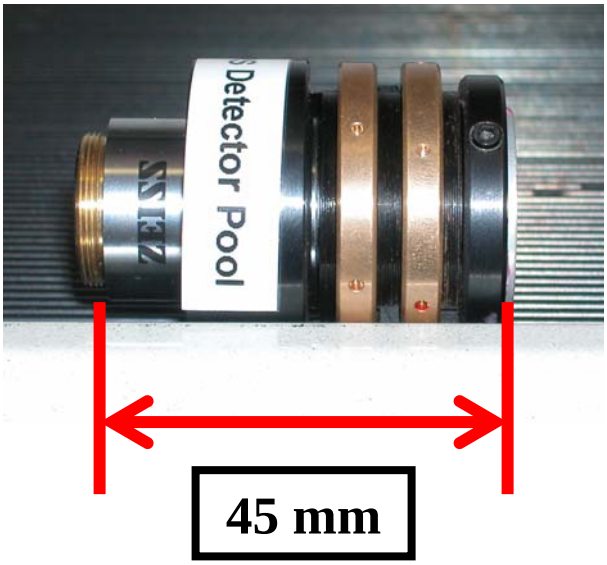
Overview of Ziess Microscope Objectives in APS Detector Pool

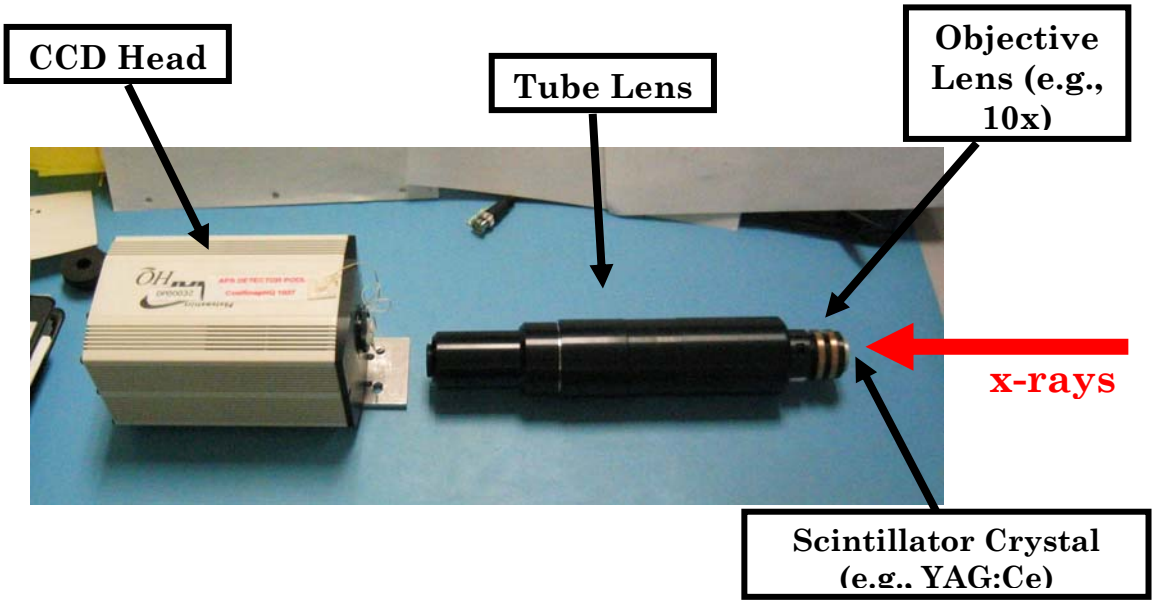
Name	P/N	Numerical Aperture	Depth of Focus (microns)	Working Distance (mm)
1.25x Plan-Neofluar (W0.8 thread)	440300	**0.035**		3.5
2.5x EC Plan-Neofluar M27 Threads	420320-9901	**0.075**	62.4	9.5
5x W0.8 Threads	440320	**0.16**	15.6	18.5
10x W0.8 Threads	440330	**0.3**	3.9	5.5
20x	???	**0.5**	1.8 (?)	2.0



Custom Tube Lens

The microscopy optics used with the DP CoolSnap where handed down from designs from Sector 2. They use Zeiss Objective Lenses which are infinite-corrected. This means that a tube lens is needed to re-image on to the CCD focal plane. The tube lens was custom-made by an optics consultant (Uwe Langenbach at Desna Laboratories, Inc. in White Plains NY (914) 948-9502). The scintillating crystal is mounted on a black anodized holder with 2 brass rings for manual focusing (Emil Trakhtenberg). The optics are designed in such a way that the nominal focus of the optics is fixed. **Nominally, the crystal should be 45mm front the back edge of the objective lens (see picture)**. Using calipers, one can get in the right ballpark. The next step is to use the imperfections that are attached to the crystal to focus. (See above images.) Using a bright light shining on the crystal, you will be able to see various things ("junk") on the crystal. (You can tell what is on the crystal versus other artifacts from dust downstream in the tube lens and CCD by rotating the objective lens and see what moves.) The final step is to use x-rays. The crystals in the DP have thin active/doped layers (e.g., 1 and 5 microns). So, we want to focus on the thin doped layer. There are various ways that Beamline Scientists tend to do this (ask Francesco de Carlo or Christoph Rau). We need to learn this, but we also need beamtime or an x-ray tube.




CCD Head
Tube Lens
Objective Lens (e.g., 10x)
x-rays
Scintillator Crystal (e.g., YAG:Ce)