Object Oriented NeXus Classes

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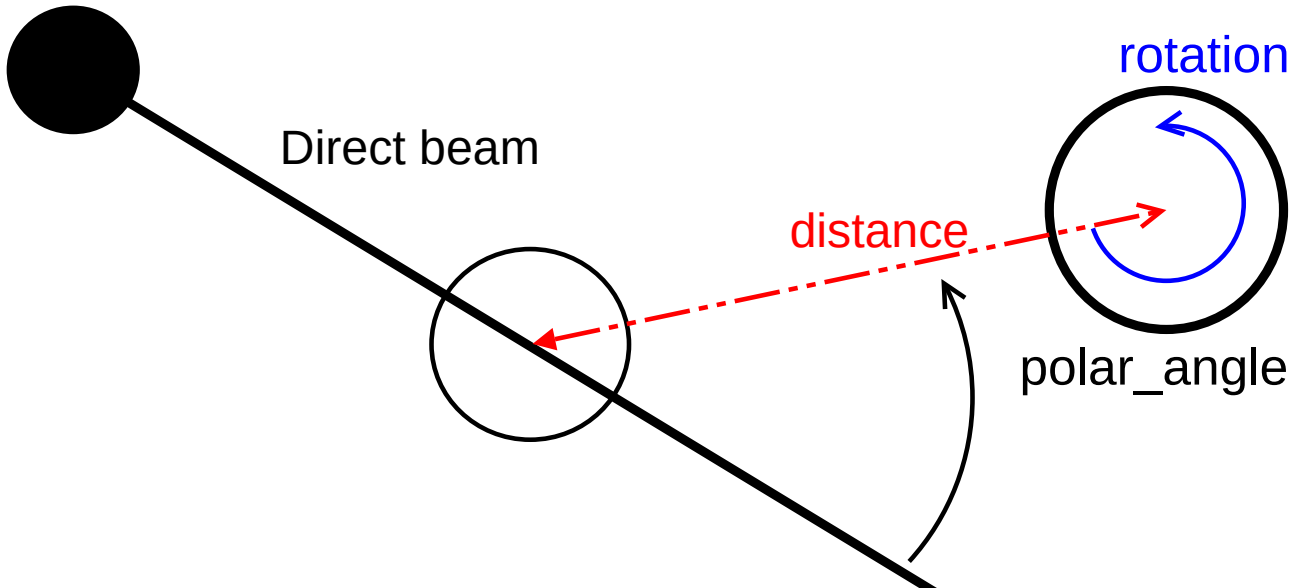
Simple Coordinate System

- The plane perpendicular to the main rotation axis of the sample table de£nes the scattering plane of the instrument.
- As components are commonly positioned using angles, a polar coordinate system is used.
- When distances are required then we assume that the sample is a zero. Distances towards the source are negative, distances behind the sample, towards the detector are positive.

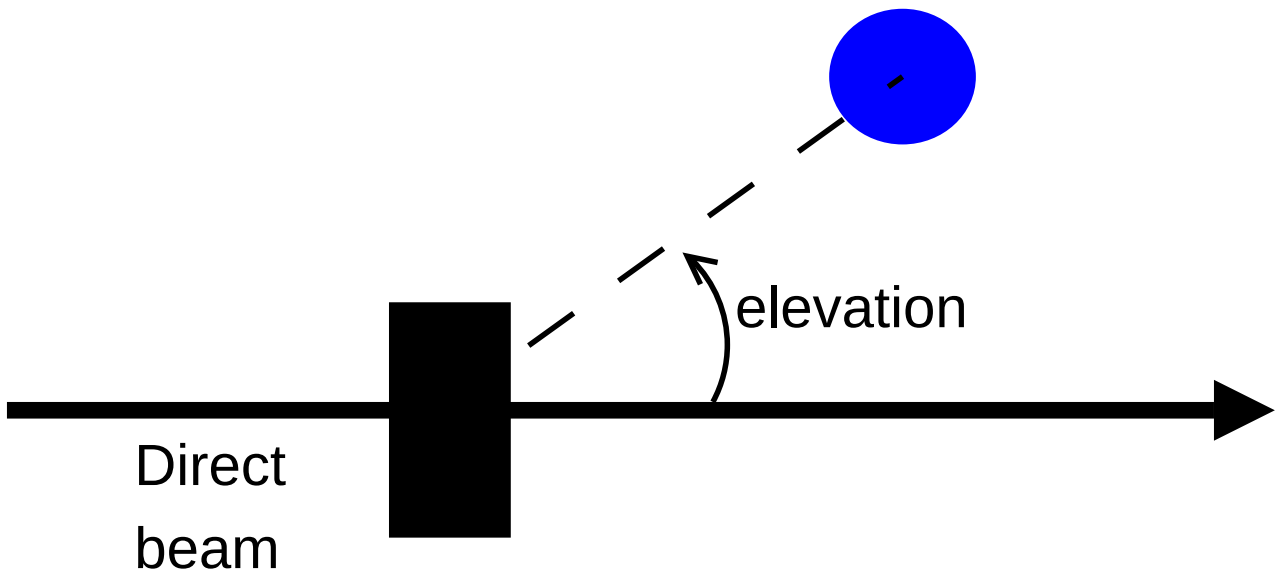
Polar Angle, Distance and Rotation

- The angle between the extension of the direct beam between a given component and its previous component and the projection of a third component onto the scattering plane is the polar_angle. This corresponds to longitude in a a geographical coordinate system. In scattering this is synonymous with two theta or gamma in normal beam geometry.
- Birds eye view on scattering plane:



Elevation

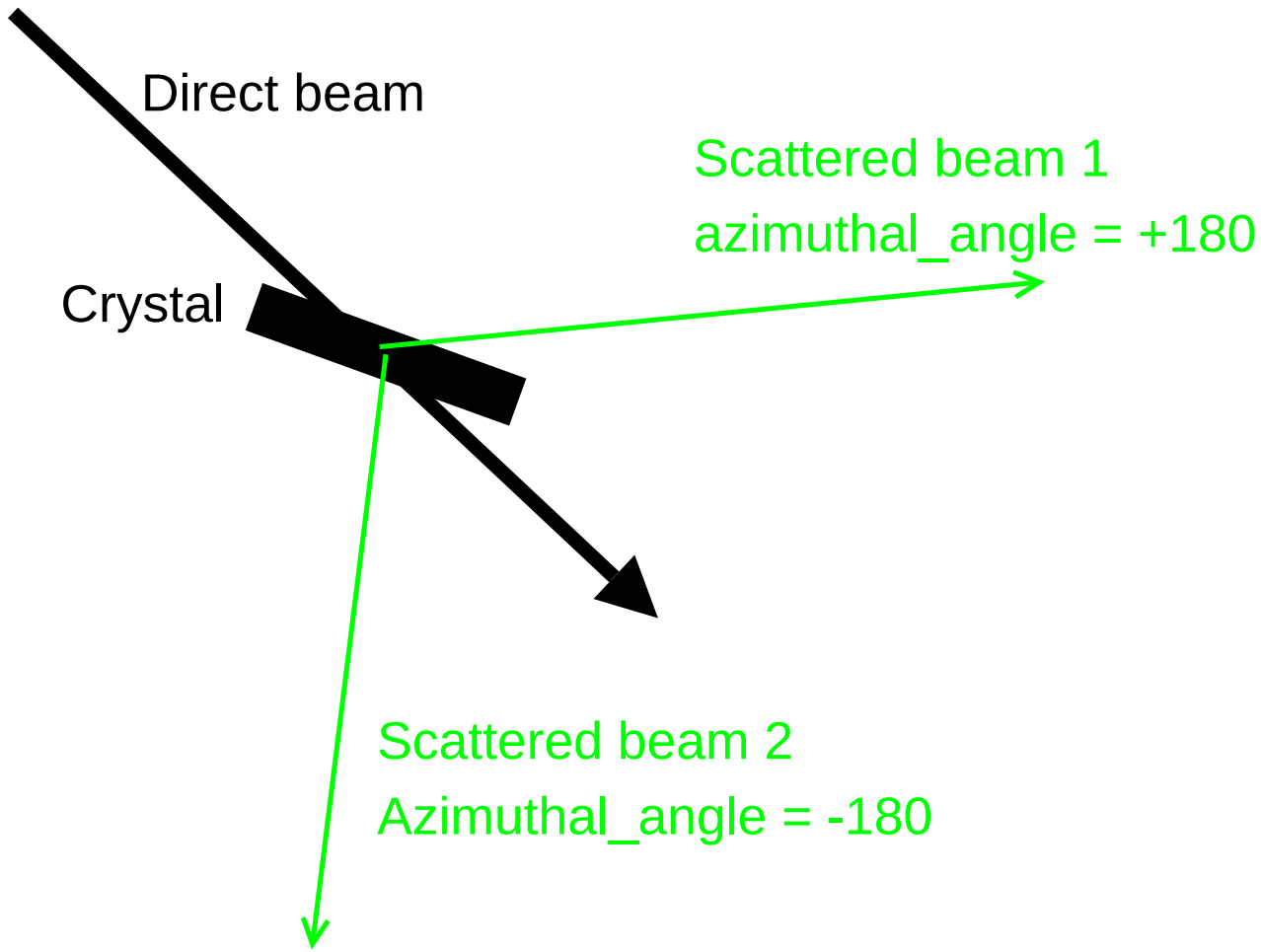
- Standing besides the instrument:



- Elevation corresponds to latitude in geography. In neutron scattering this is often the angle nu.

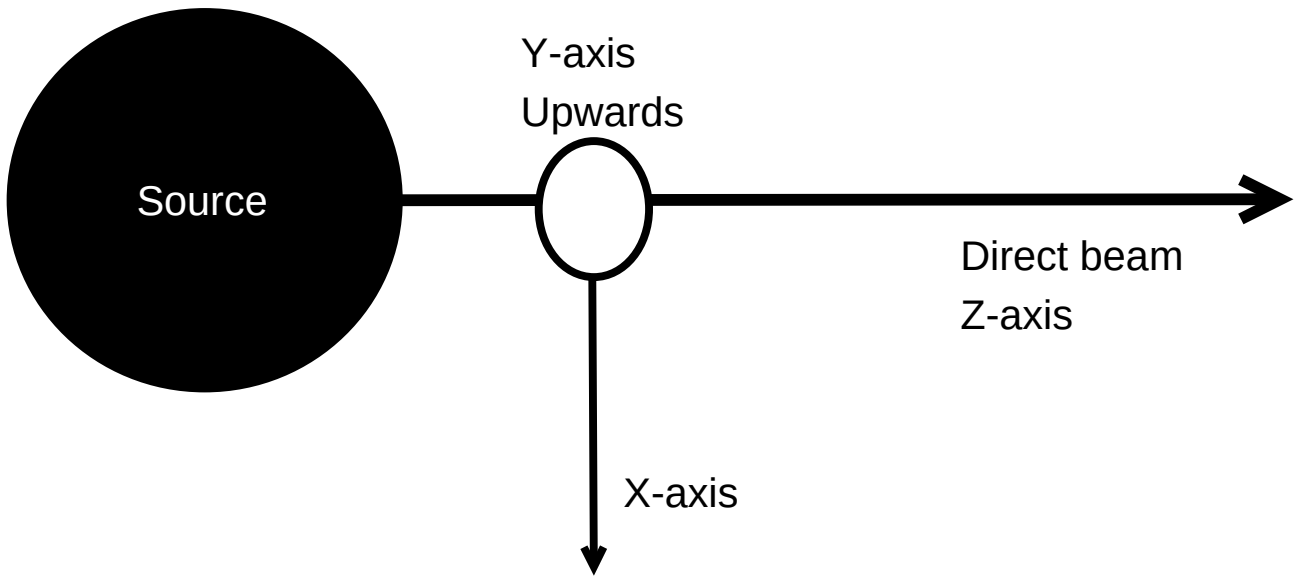
Azimuthal Angle

- Again birds eye view onto the scattering plane

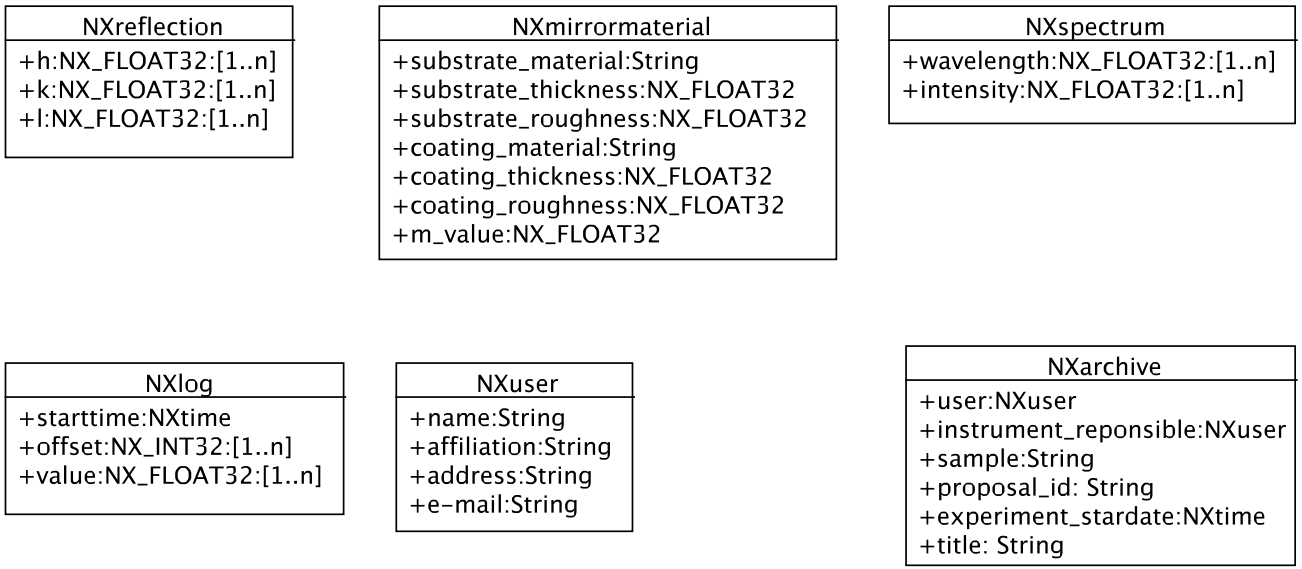


McStas Coordinates

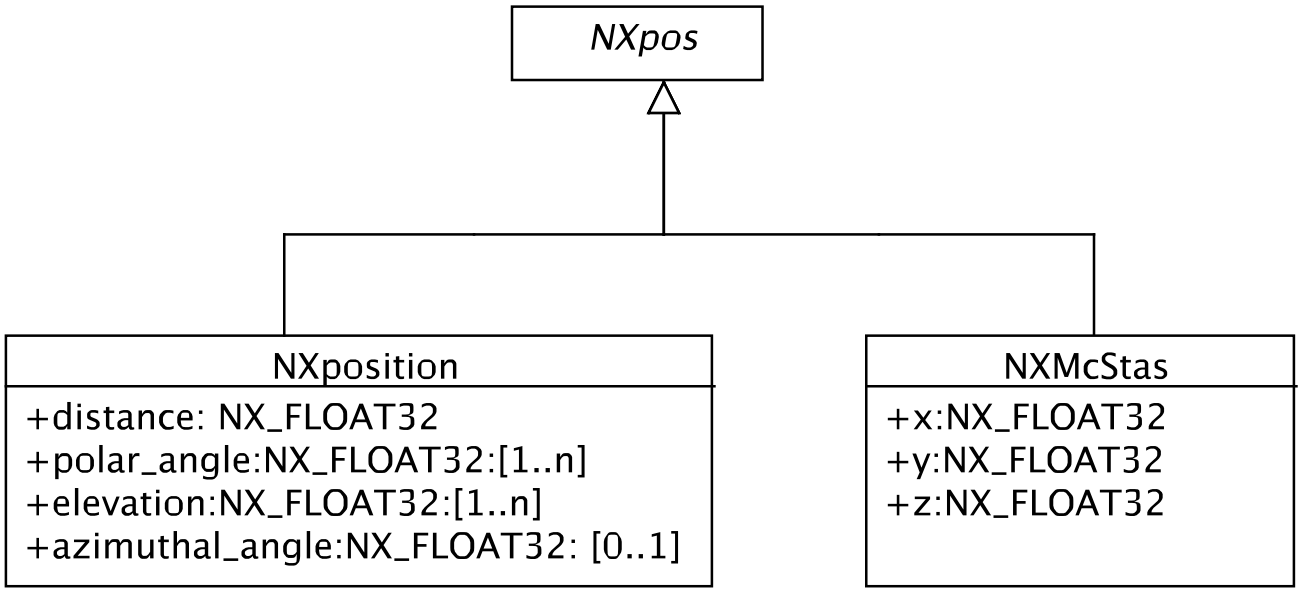
- Birds eye view again:



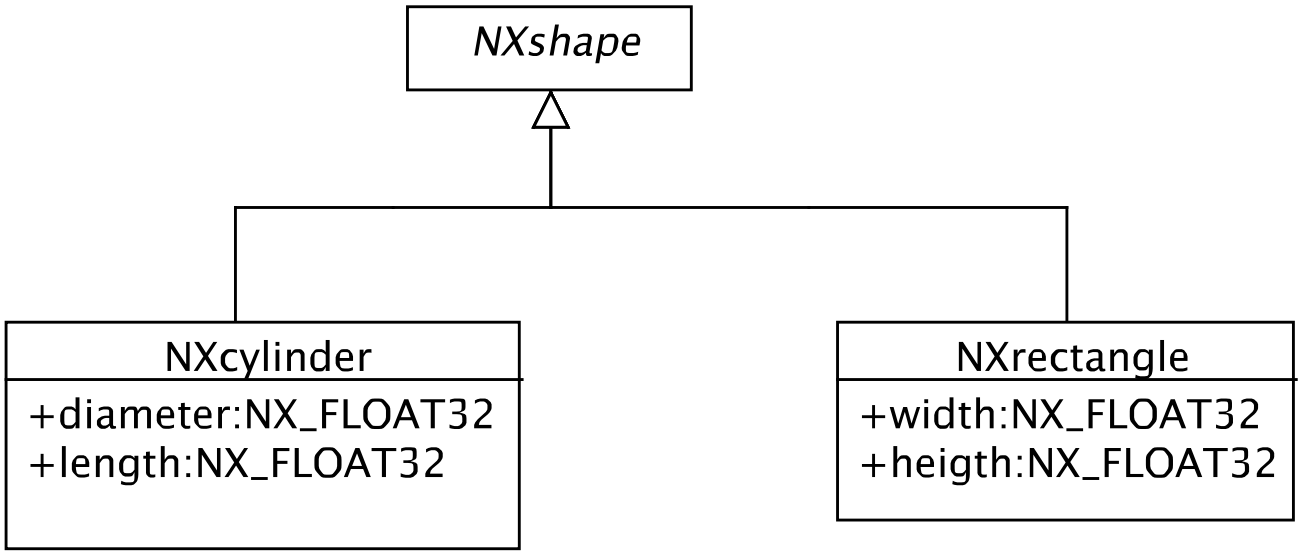
Miscellaneous Classes



NeXus Position



NeXus Shape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NXrectangle
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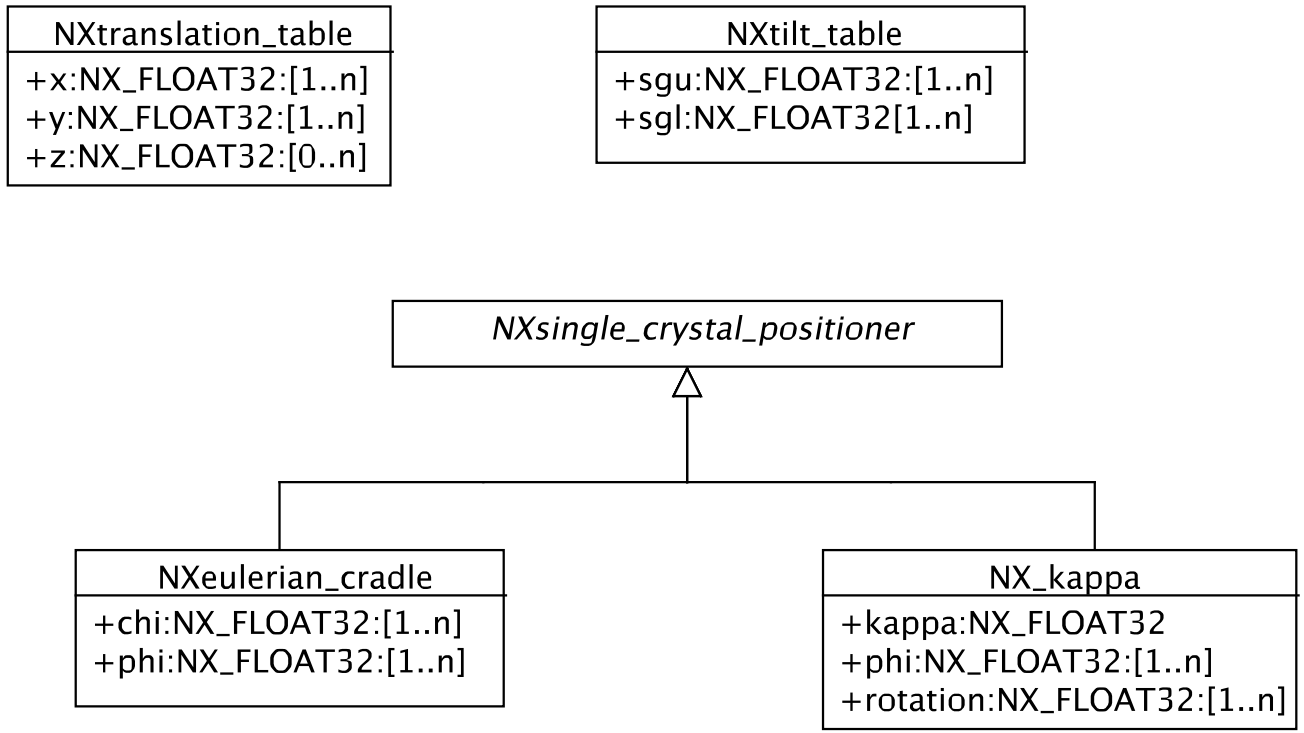
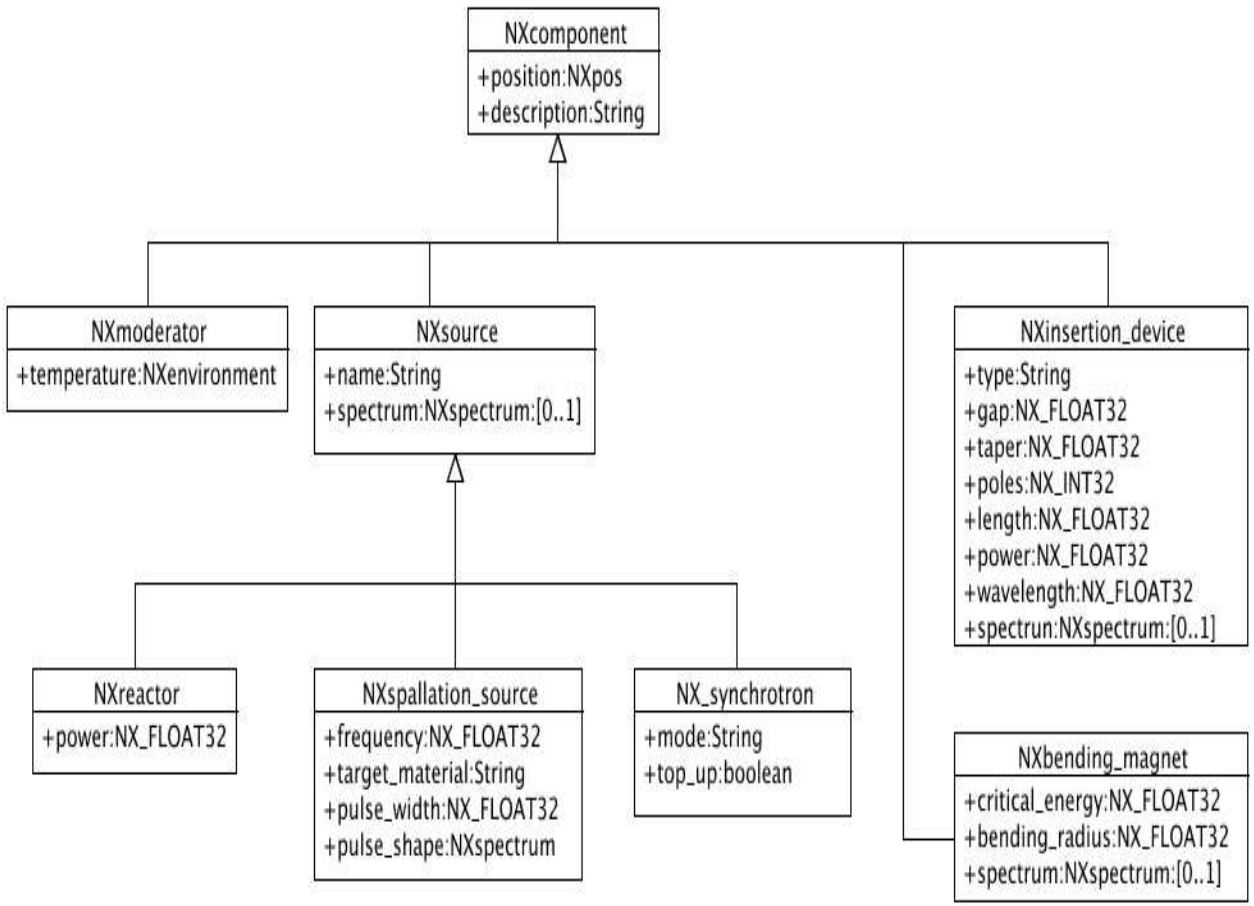
+heigth:NX_FLOAT32

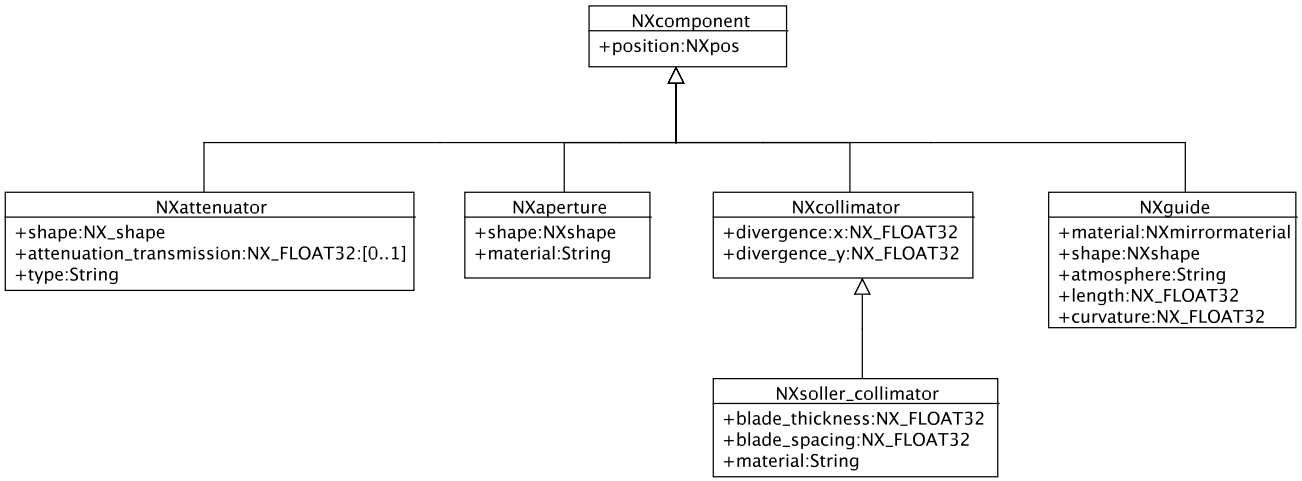
NeXus Stages



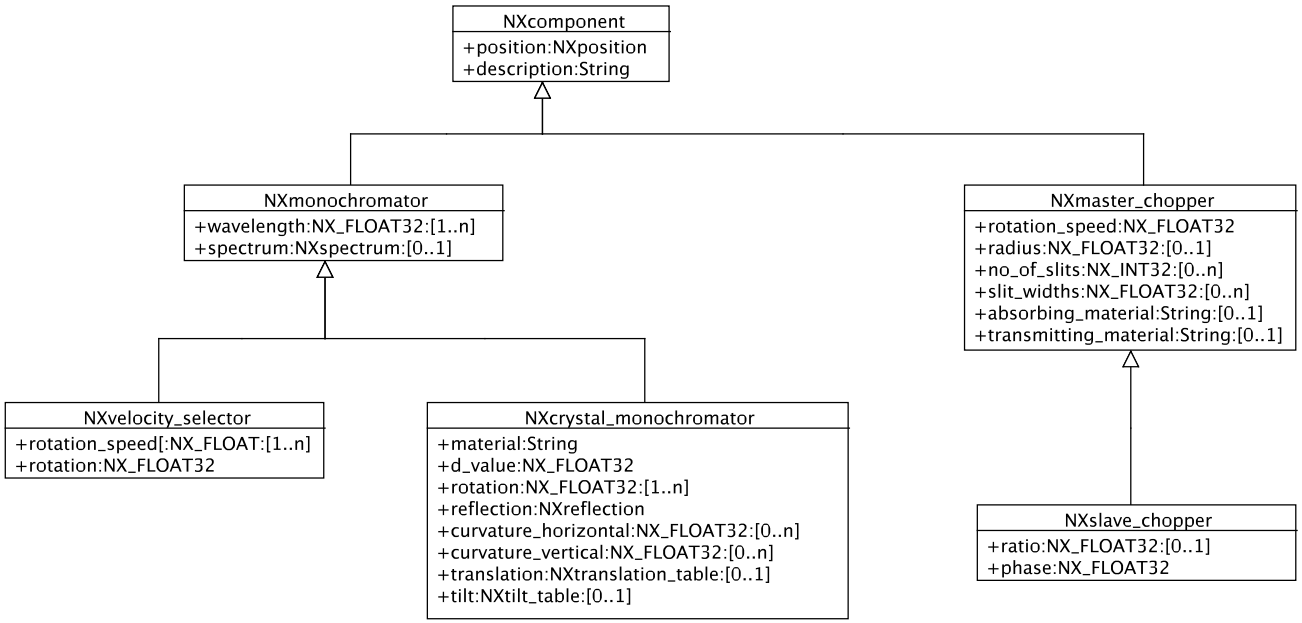
Source Components



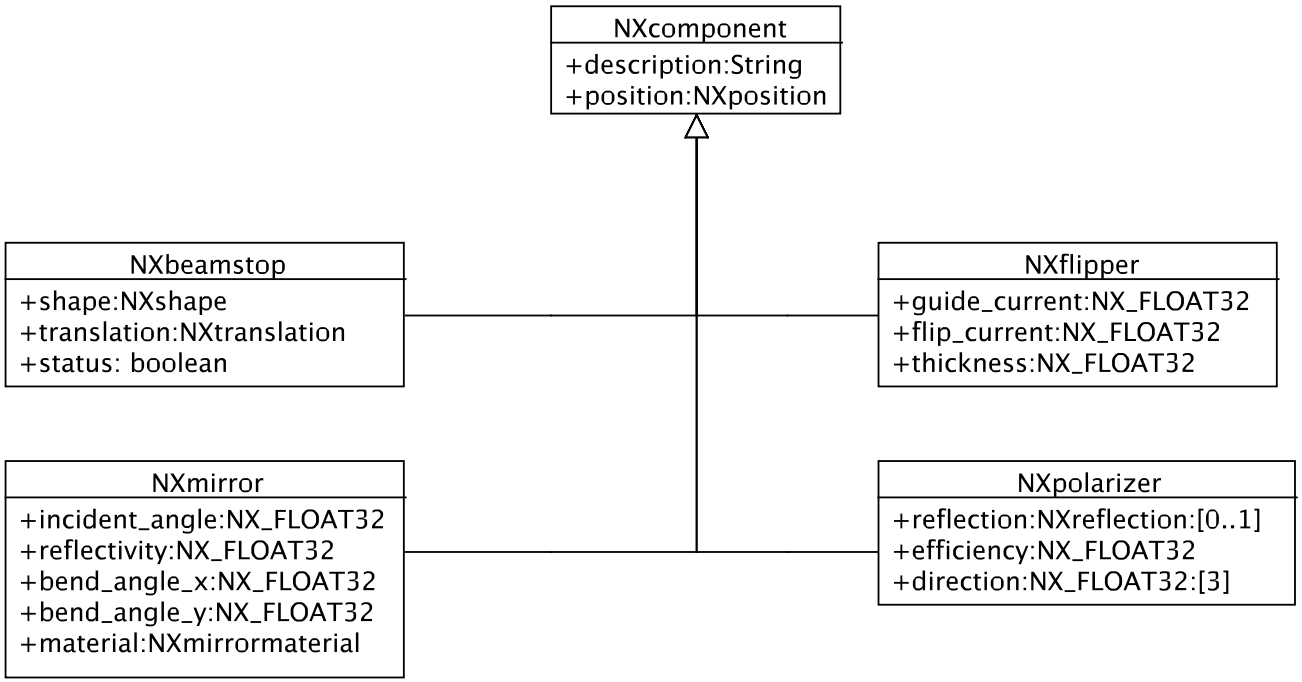
Passive Beam Line Components



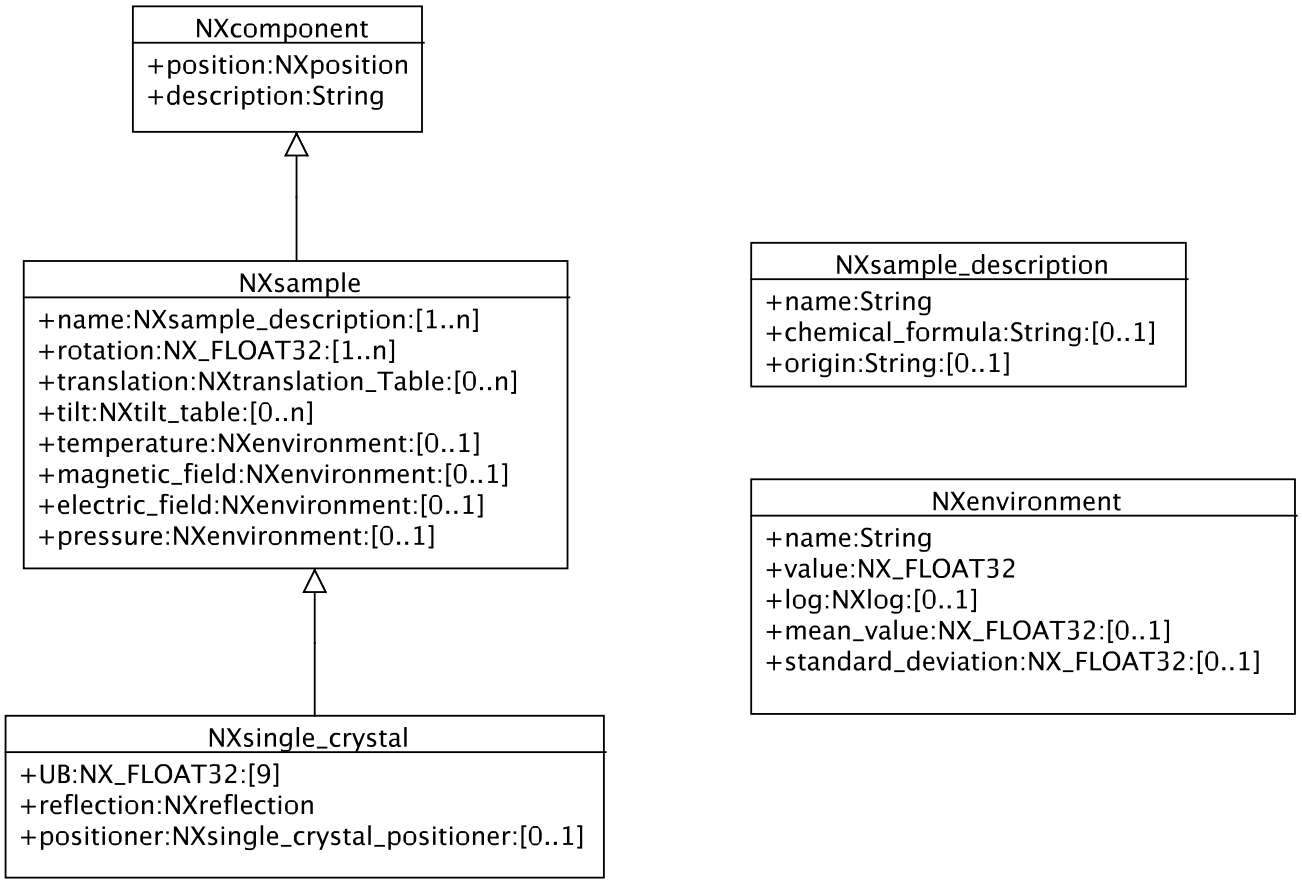
Active Beam Line Components



More Beamline Components



Samples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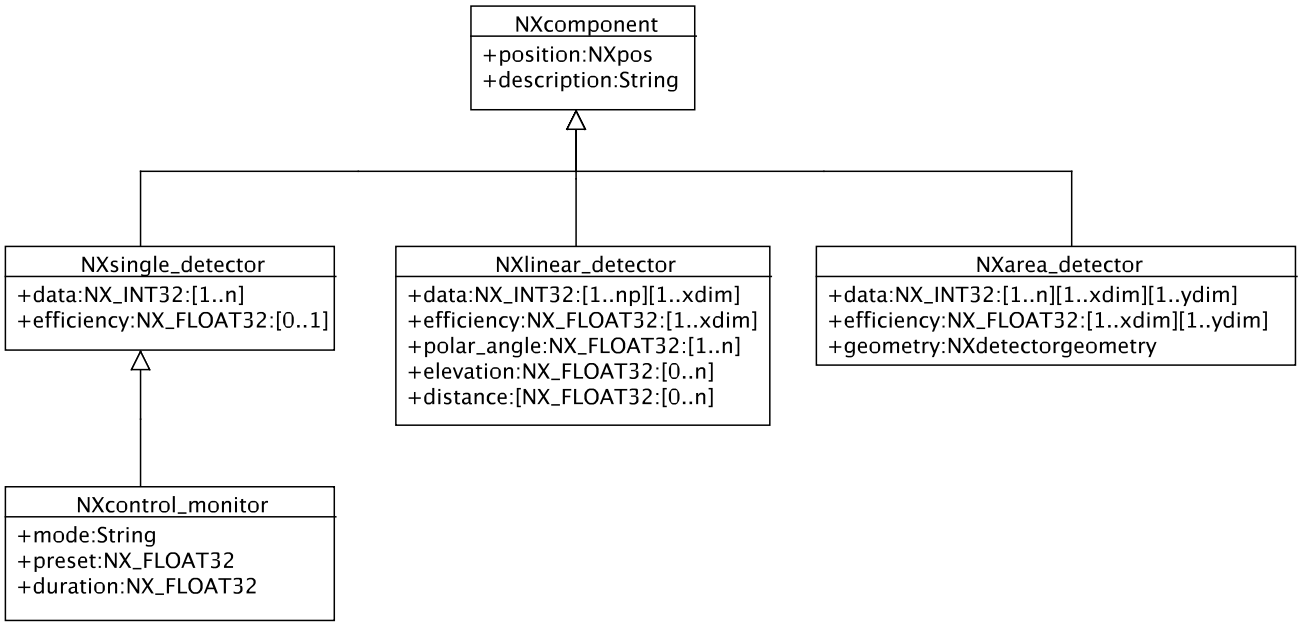
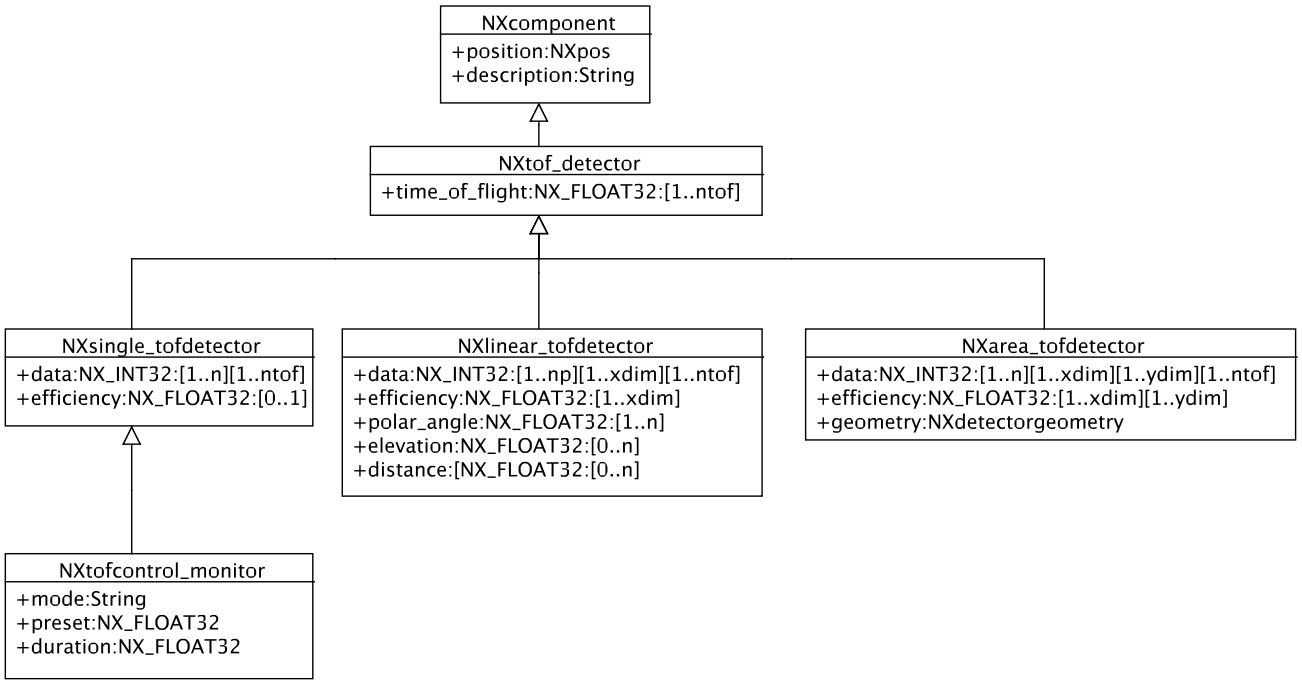
Detectors

- Concerning data handling there are the following types of detectors:
  - single detectors
  - linear detectors
  - area detectors
  - ID detectors
- Detectors have different geometries:
  - Detectors can have regular shapes: rectangles, lines etc which are best described as such
  - Some detectors (especially @ ISIS) are highly irregular: Then we need to describe each pixel.
- For each detector pixel we need to be able to deduce:
  - The scattering angle towards the previous component
  - The elevation out of the scattering plane

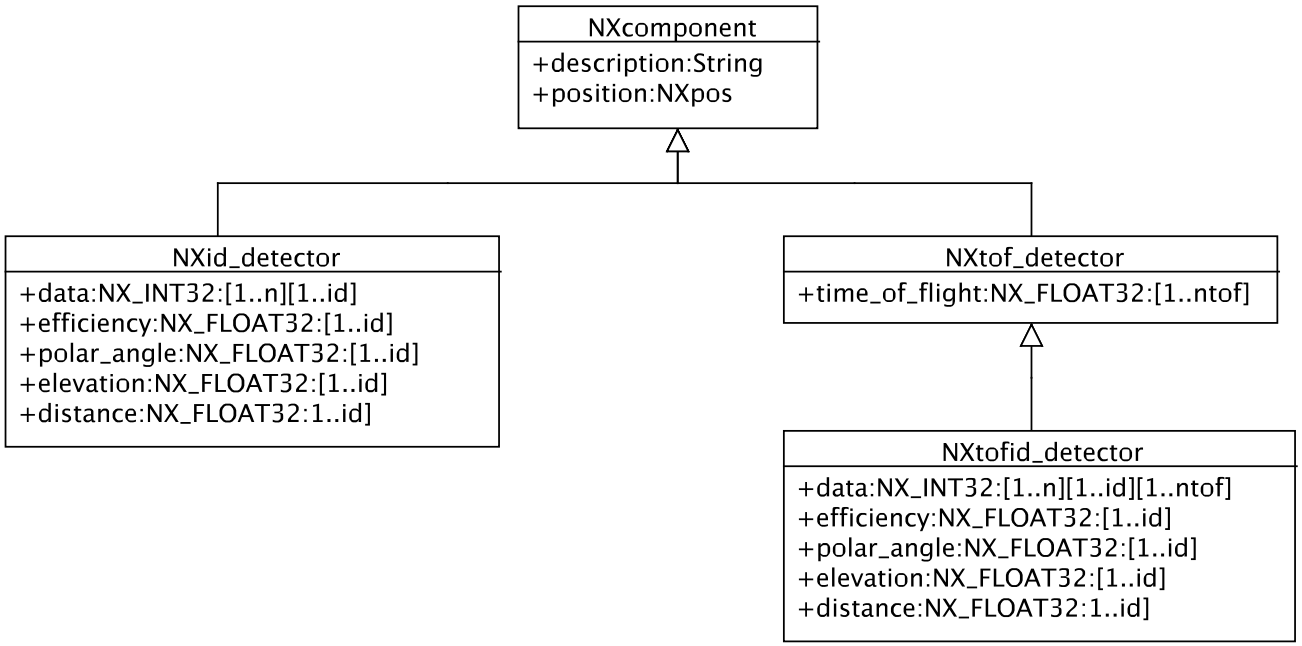
Non-TOF Detectors



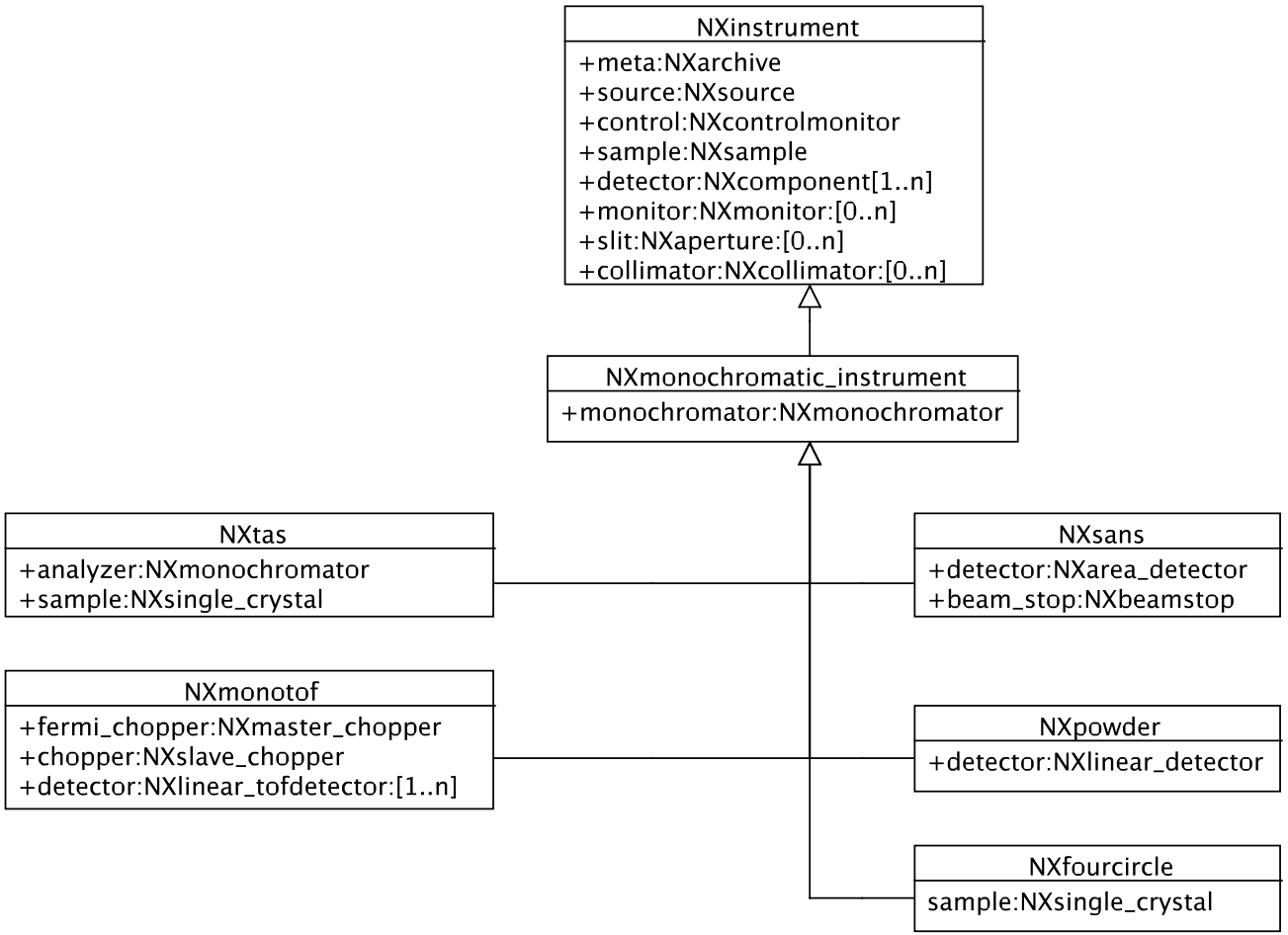
TOF-Detectors



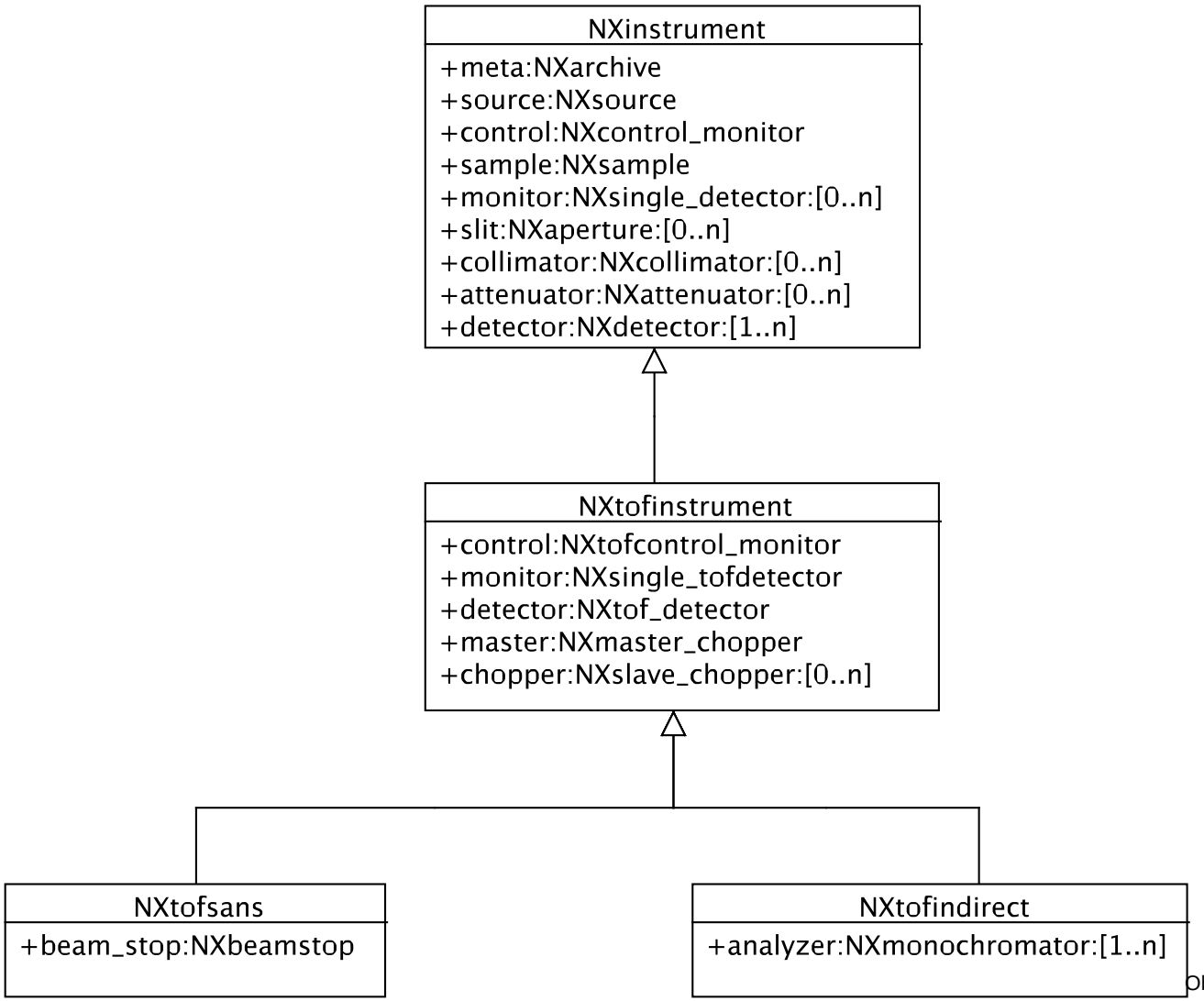
More Detectors



Monochromatic Instruments



TOF Instruments



Conclusion

- The current NeXus classes are messy due to lack of specialization
- More classes improve clarity
- Inheritance brings better maintainability: for instance adding NXellipitcal as a NXshape does not require changes downstream
- Caveats:
  - backwards compatability dif£cult
  - description in XML problematic