# **Multidimensional photoemission spectroscopy definition**

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Here, we try to create a definition that contains the minimal set of information of a MPES experiment oriented to automatic analysis, as a demonstrator of a draft definition. This is a "super definition" trying to encompass and allow interoperability across the whole ARPES community.

Our working idea (to be discussed) is that it is possible to "layer" definitions of increasing specificity to maximize interoperability without limiting the capabilities of software based on this structure.

A basic visualization tool would then look for the NXmpes definition, allowing to open and go through essentially any output of an ARPES experiment in volumetric form. More specific analysis tools may then look for more stringent definitions such as, for example: root.entry.definition\_flavor=NXfield('NXmpes\_tr') or root.entry.definition\_facility=NXfield('NXmpes\_FLASH') and thus achieve automated access to a wider set of metadata.

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| Nexus level 0 | Level 1 | Level 2 | Parameter | Description |
| NXentry |  |  |  | Base NeXus level. Must be called “entry” plus a progressive number. |
| NXentry | NXinstrument |  |  | Contains metadata about the instrument |
| NXentry | NXinstrument | NXbeam |  | The beam class defines beam properties at sample |
| NXentry | NXinstrument | NXbeam | distance | Distance from the sample at which beam properties are measured |
| NXentry | NXinstrument | NXbeam | photon\_energy | Photon energy of the probe beam at sample |
| NXentry | NXinstrument | NXpositioner |  | Manipulator. Detailed parameters are not strict |
| NXentry | NXinstrument | NXdetector:analyser |  | Analyser. The name of the detector object must be analyser |
| NXentry | NXinstrument | NXdetector:analyser | lens\_mode | referring to an external lens table/file |
| NXentry | NXinstrument | NXdetector:analyser | pass\_energy | also drift energy in case of tof analyser |
| NXentry | NXinstrument | NXdetector:analyser | energy\_scan\_mode | ‘fixed’ or ‘sweep’ |
| NXentry | NXsample |  |  | Information about the sample |
| NXentry | NXsample |  | temperature | Sample temperature during measurement |
| NXentry | NXsample |  | pressure | Pressure at the sample during measurement |
| NXentry | NXdata |  |  | Contains data. Must be volumetric and from 2D upwards. |