Components and detectors
requirements/flow/import-export

Component requirements for production(incl. yield)

HDIs (~100k)

- Assumed:
  - Inner layers: 18 + 100% spares, overall HDI yield $EY_{HDIs,inner}$ (assumed as 50% means we need 72 HDIs)
  - Outer layers: 156 + 50% spares, overall HDI yield $EY_{HDIs,outer}$ (assumed as 60% means we need 390 HDIs)

MuPix11 (thinned and diced) (~300k?)

- Needed:
  - Inner layers: 108 + 100% spares, overall chip yield $EY_{chips,inner}$ (if assumed 50% need ~ 432 chips or 41 wafers)
  - Outer layers: 2736 + 50% spares, overall chip yield $EY_{chips,outer}$ (if assumed 60% need ~6840 chips or ~171 wafers)

Swiss PCB flexes (~30-50k??)

Needed:

Inner interposer flexes: 36 + 100% spares, overall yield $EY_{interposers,inner}$ (if assumed 50% need ~144)

Outer interposer flexes needed: 312 + 50% spares, overall yield $EY_{interposers,outer}$ (if assumed 60% need ~780)

Outer endpiece flexes needed: 78 + 50% spares, overall yield $EY_{interposers,outer}$ (if assumed 60% need ~ 195)

FROM SLIDES ON YIELD

Component flow in and out of UK during production

Into the UK:

- MuPix11 ASICS (depending on yield up to 170 diced and thinned wafers)

- 390 HDIs

- Up to 800 interposer flexes and 200 endpiece flexes

Exported out of UK

- 39 working modules + 50% spares

- *Failed and left-over components*

Actions

To understand:

- Who procures which items? – Are these send directly to the UK/Germany? - Are these procured with or without VAT? - Is anyone in the chain VAT exempt?

- Who own components, at each stage of production, and what happens to the ownership after delivery to PSI? Suggestion Stefan is to assume Pixel detector would be a temporary import to Switzerland.

For the UK to avoid a large VAT bill we most likely need

1. Ensure all imported components are tracked and ultimately re-exported as modules and any failed/leftover stock.

2. All import and export to go through one party (either Liverpool or Oxford) reclaiming VAT at re-export or using a duty deferment account.

3. Need consistent use of commodity codes on al paperwork. (Difficult to ensure, when items get shipped around by different parties).

Solution used for other projects (ATLAS ITK, Darkside): all shipments arranged through one party, both for goods sent to the UK and from the UK!

Are there similar issue for inner pixel production at Heidelberg and shipment to PSI?