Instrument Description

The "https://topswiki.saao.ac.zaInstrument Selector"https://topswiki.saao.ac.za is essentially a new fold mirror that has been installed in the acquisition boxes of both SpUpNIC and HiPPO[1] that allows the observer to switch between two instruments: a "https://topswiki.saao.ac.zaprimary"https://topswiki.saao.ac.za and a "https://topswiki.saao.ac.zasecondary"https://topswiki.saao.ac.za instrument where the primary instrument is either SpUpNIC or HiPPo and the secondary instrument is always a new SHOC system, SHOCnWonder. In other words, an imaging camera is now always mounted on the 1.9m, alongside either the spectrograph or the polarimeter, and the fold mirror can be positioned to use either primary or secondary instrument at any time.

Figure 1 shows how the new SHOC system is mounted to the side of SpUpNIC's acquisition box. The new fold mirror that acts as the instrument selector is shown in the top panel and actuates IN/OUT of the science beam above the guide mirror. The new SHOC system replaces the XY slide box that use to migrate between SpUpNIC and HiPPo. The SHOC system is incorporated into a newly designed off-axis "https://topswiki.saao.ac.zapick-off"https://topswiki.saao.ac.za style guider system that can accommodate a filter wheel unit and SHOC camera behind the guider. It also has a focal reducer built in providing just over double the FoV-width compared to the the old system (2.7' × 2.7' for the new system vs. 1.3' × 1.3' for the old setup).

Figure1: Instrument Selector Concept and new SHOC system mounted to the side of SpUpNIC's acquisition box

To select between the primary instrument and SHOC, a user can actuate the fold mirror in/out of the beam to direct the science beam towards the desired instrument (see Figure 2 below that indicates the button on TCS that actuates the fold mirror). When the fold mirror is IN beam and the guider's XY stages are "https://topswiki.saao.ac.zacentred"https://topswiki.saao.ac.za then the guide camera also functions as a target acquisition camera for SpUpNIC/HiPPo, similar to the old system. Also as in the old system, the guide camera can patrol the area of the large annulus mirror to acquire an appropriate guide star.

Figure2: Button (and indicator) that actuates the fold mirror. It will remain green in both states (IN or OUT)

Important Notes

NB. (1) Because the fold mirror and annulus guide mirror are displaced relative to one another in the optical z-axis (see Figure 1), the guide/acquisition camera's focus has to be adjusted substantially when switching between guiding and target-acquiring mode. A cheat-sheet provides guidelines for focus settings and summarises instructions how to set up target-acquisition and guiding for the primary and secondary instrument: cheat-sheet.

NB. (2) The annulus mirror, which used to be actuated to switch between acquistion and guiding mode, should **NOT** be actuated anymore for any reason. There is no danger in doing so but the new routines rely on the annuls mirror staying in the "https://topswiki.saao.ac.zaSCIENCE"https://topswiki.saao.ac.za position (see Figure 3 below). There are plans to maybe disable the actuating motor eventually.

Figure3: The annulus "https://topswiki.saao.ac.zaGuide Mirror"https://topswiki.saao.ac.za should always remain in the "https://topswiki.saao.ac.zaSCIENCE"https://topswiki.saao.ac.za position as indicated and should **NOT** be

actuated anymore for any reason.

1. ? *22 Feb 2024: the implementation of the fold mirror in HiPPo's acquisition box has not been completed at time of writing*