# TIDI Filter Wheel #1

| Position | Wavelength (nm-air) | FWHH (nm) | Feature | Notes |
|---|---|---|---|---|
| 1 | 867.1 3 | 0.3 | $O_2(^1S)$ (0-1) P11 pair (11531 .7989 $cm^{-1}$ and 11536.7235 $cm^{-1}$) and Ar (866.79 nm) | $O_2$ and calibration filter for winds and rotational temperatures (60 - 85 km) w/ 866.1 2 nm |
| 2 | 763.68 | 0.3 | $O_2(^1S)$ (0-0) P9 pair (13093.64 07 $cm^{-1}$ and 13091 .6958 $cm^{-1}$) and Ar (763.51 nm) | $O_2$ and calibration filter for winds and rotational temperatures (85 - 120 km) w/ 765.07 nm |
| 3 | 557.8 | 0.5 | OI ($^1S$) | green line filter for winds (90 - 250 km) and Doppler temperatures (100 - 150 km) |
| 4 | OG 515 | N/A | high pass filter | high transmission above 515 nm, removes UV and blue light |
| 5 | 630.1 | 0.5 | OI ($^1D$) and Ne (630.4 8 nm) | red line and calibration filter winds and Doppler temperatures (200 - 300 km) |
| 6 | 765.07 | 0.3 | $O_2(^1S)$ (0-0) P15 pair (13069.94 59 $cm^{-1}$ and 13068.0662 $cm^{-1}$) | $O_2$ for winds and rotational temperatures (80 - 125km) w/ 763.68nm |
| 7 | 866.1 2 | 0.3 | $O_2(^1S)$ (0-1) P7 pair (11545.2971 $cm^{-1}$ and 11543.3255 $cm^{-1}$) and Ar (866.79 nm) | $O_2$ and calibration filter for winds and rotational temperatures (60 - 85 km) w/ 867.1 3 nm |
| 8 | 892.1 | 0.5 | OH Meinel (7-3) P1(3) pair and Ne(891 .95 nm) | OH and calibration filter nocturnal winds and temperatures (80 - 90 km) |

# TIDI Filter Wheel #2

| Position | Wavelength (nm-air) | FWHH (nm) | Feature | Notes |
|---|---|---|---|---|
| 1 | OG 515 | N/A | high pass filter | high transmission above 515 nm, removes UV and blue light |
| 2 | 732.1 | 0.5 | OII ($^2$P) pair | plasma drift winds (170 - 300 km) |
| 3 | 844.8 | 0.5 | O triplet | auroral winds (150 - 300 km) |
| 4 | 557.2 | 0.5 | OI ($^1$S) cal filter<br>Kr (557.03 nm) | green line calibration filter |
| 5 | 589.4 | 1.0 | NaD doublet and<br>Ne (590.25 nm) | sodium for nocturnal and auroral winds and temperatures<br>(85 - 95 km) |
| 6 | 779.5 | 0.5 | OH Meinel (9-4) P1(2) pair | OH for nocturnal and auroral winds and temperatures (80 - 90 km) |
| 7 | 764.0 | 4.0 | $O_2$($^1$S) (0-0) P branch and Ar (763.51 nm) | band brightness w/ 761.0 nm |
| 8 | 761.0 | 2.0 | $O_2$($^1$S) (0-0) R branch and Kr (760.15 nm) | band brightness w/ 764.0 nm |

# Science-Driven Requirements

| Requirement | Value |
|---|---|
| Accuracy (wind)<br>[other products do not drive design] | 3 m/s l.o.s. (uninverted) |
| Altitude coverage | 60-300 km<br>(primary 60-180 km) |
| Vertical resolution | 2.0 km |
| Tangent point altitude knowledge | 1 km |
| Telescope field overlap | ~100 km |
| Lifetime | >2 years |
| Local time coverage | 24 hours/120 days (3°/day) |
| Latitude coverage | Pole-to-pole |
| Horizontal resolution | ~500 x 500 km |

**BOLD** - most directly drives TIDI design