CLAIMS

1. An infrared spectrometer comprising:

a first single pixel detector sensitive to infrared light in a first spectral range;

an entrance slit for receiving an infrared light signal;

a moveable encoding mask disposed between the entrance slit and the first single pixel detector for encoding based multiplexing, the moveable encoding mask comprising one or more adjacent coding sections;

a dispersion and imaging optics disposed between the entrance slit and the moveable encoding mask for dispersing the infrared signal and for imaging the dispersed infrared signal onto the moveable encoding mask;

a collection optics disposed between the moveable encoding mask and the first single pixel detector for collecting an encoding based multiplexed version of the infrared signal onto the first single pixel photodetector; and

a second single pixel detector sensitive to a wavelength of a reference laser signal, wherein the dispersion and imaging optics is configured to image the reference laser signal received via the entrance slit onto the moveable encoding mask and the collection optics is configured for collecting the reference laser signal comprised in the encoding based multiplexed version of the infrared signal onto the second single pixel detector for calibration of a recovered spectrum of interest within the first spectral range in the first single pixel detector.

2. The spectrometer of claim 1, wherein the moveable encoding mask comprises a movement calibration pattern outside the one or more adjacent coding sections, and the spectrometer further comprises an encoder module coupled to the moveable encoding mask for generating a varying output signal based on movement of the movement calibration pattern relative to the encoder module.

3. The spectrometer of claim 2, wherein the movement calibration pattern comprises slits or pixels, and the encoding module generates an output signal representative of movements in steps of single slits or pixels of the encoding sections.

4. The spectrometer of claim 3, wherein the slits or pixels have twice a width of slits or pixels of the encoding sections, and the encoding module generates a two phase output signal representative of movements in steps of single slits or pixels of the encoding sections.

5. The spectrometer of claim 3, wherein the slits or pixels have the same width of slits or pixels of the encoding sections, and the encoding module generates a single phase output signal representative of movements in steps of single slits or pixels of the encoding sections.

6. A method of performing infrared spectrometry comprising the steps of:

providing a first single pixel detector sensitive to infrared light in a first spectral range;

providing an entrance slit for receiving an infrared light signal;

disposing a moveable encoding mask between the entrance slit and the first single pixel detector for encoding based multiplexing, the moveable encoding mask comprising one or more adjacent coding sections;

disposing a dispersion and imaging optics between the entrance slit and the moveable encoding mask for dispersing the infrared signal and for imaging the dispersed infrared signal onto the moveable encoding mask;

disposing a collection optics between the moveable encoding mask and the first single pixel detector for collecting an encoding based multiplexed version of the infrared signal onto the first single pixel photodetector; and

providing a second single pixel detector sensitive to a wavelength of a reference laser signal, wherein the method comprises configuring the dispersion and imaging optics to image the reference laser signal received via the entrance slit onto the moveable encoding mask and configuring the collection optics to collect the reference laser signal comprised in the encoding based multiplexed version of the infrared signal onto the second single pixel detector for calibration of a recovered spectrum of interest within the first spectral range in the first single pixel detector.

7. The method of claim 6, wherein the moveable encoding mask comprises a movement calibration pattern outside the one or more adjacent coding sections, and the method further comprises using an encoder module coupled to the moveable encoding mask for generating a varying output signal based on movement of the movement calibration pattern relative to the encoder module.

8. The method of claim 7, wherein the movement calibration pattern comprises slits or pixels, and the encoding module generates an output signal representative of movements in steps of single slits or pixels of the encoding sections.

9. The method of claim 8, wherein the slits or pixels have twice a width of slits or pixels of the encoding sections, and the encoding module generates a two phase output signal representative of movements in steps of single slits or pixels of the encoding sections.

10. The method of claim 8, wherein the slits or pixels have the same width of slits or pixels of the encoding sections, and the encoding module generates a single phase output signal representative of movements in steps of single slits or pixels of the encoding sections.