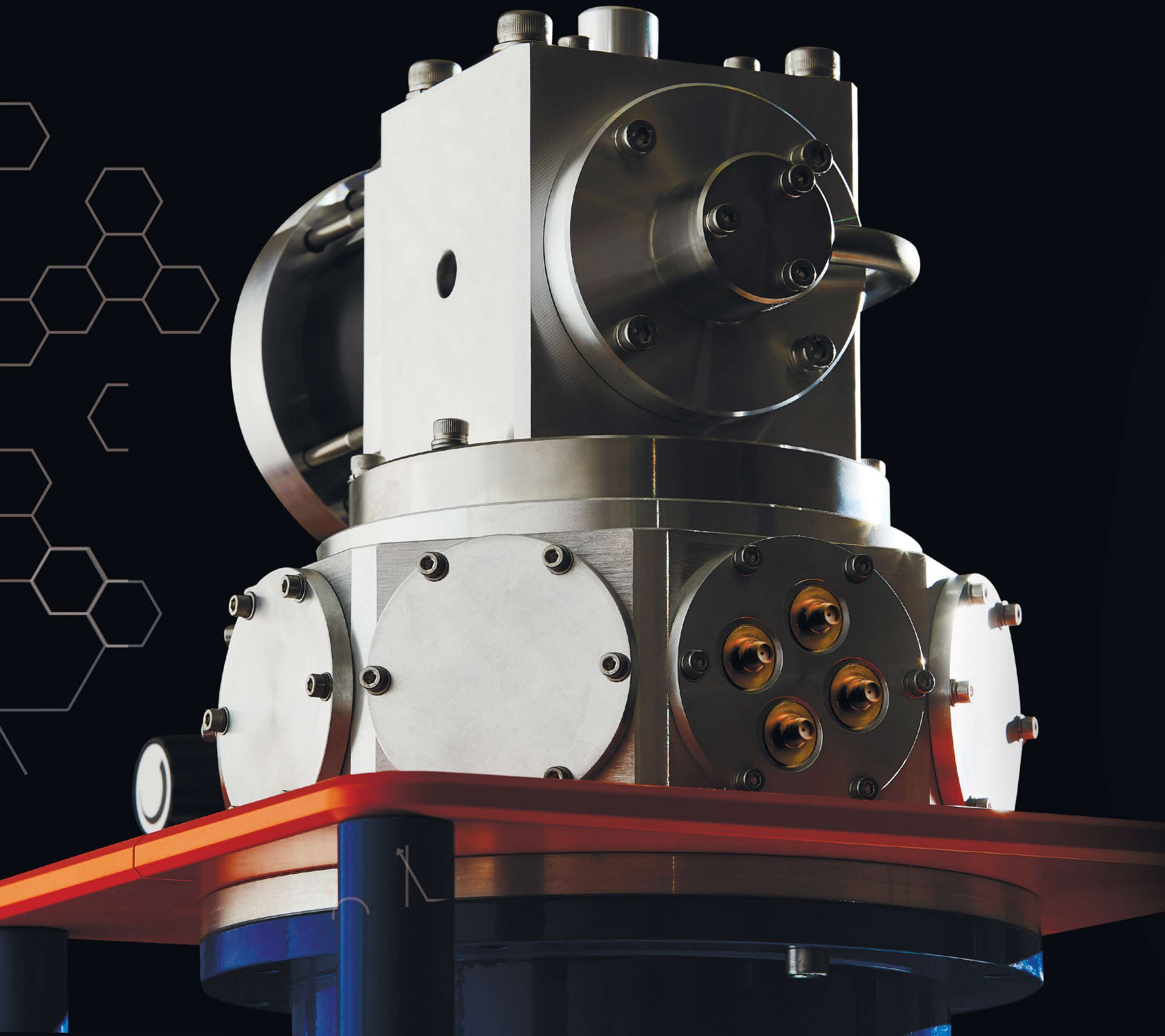




SUPERCONDUCTING NANOTECHNOLOGY

**DETECT EVERYTHING YOU WANT**

ULTRA-SENSITIVE OPTICAL DETECTORS  
**FOR ANY EXPERIMENTAL DEMANDS**



## HOT-ELECTRON BOLOMETERS

High sensitivity, sub-nanosecond resolution, picosecond response

The THz frequency range is one of the most fascinating, attractive and yet underexploited ranges of the frequency spectrum. With the world-wide growing interest and drastically increased amount of the research activity in the THz area, we are pleased to offer fast (response time down to 50 ps) and sensitive (NEP  $10^{-14}$  W/Hz<sup>1/2</sup>), low-noise superconducting Hot Electron Bolometers for the THz frequencies from 0.1 up to 100 THz. The receivers can be operated in direct or heterodyne modes.

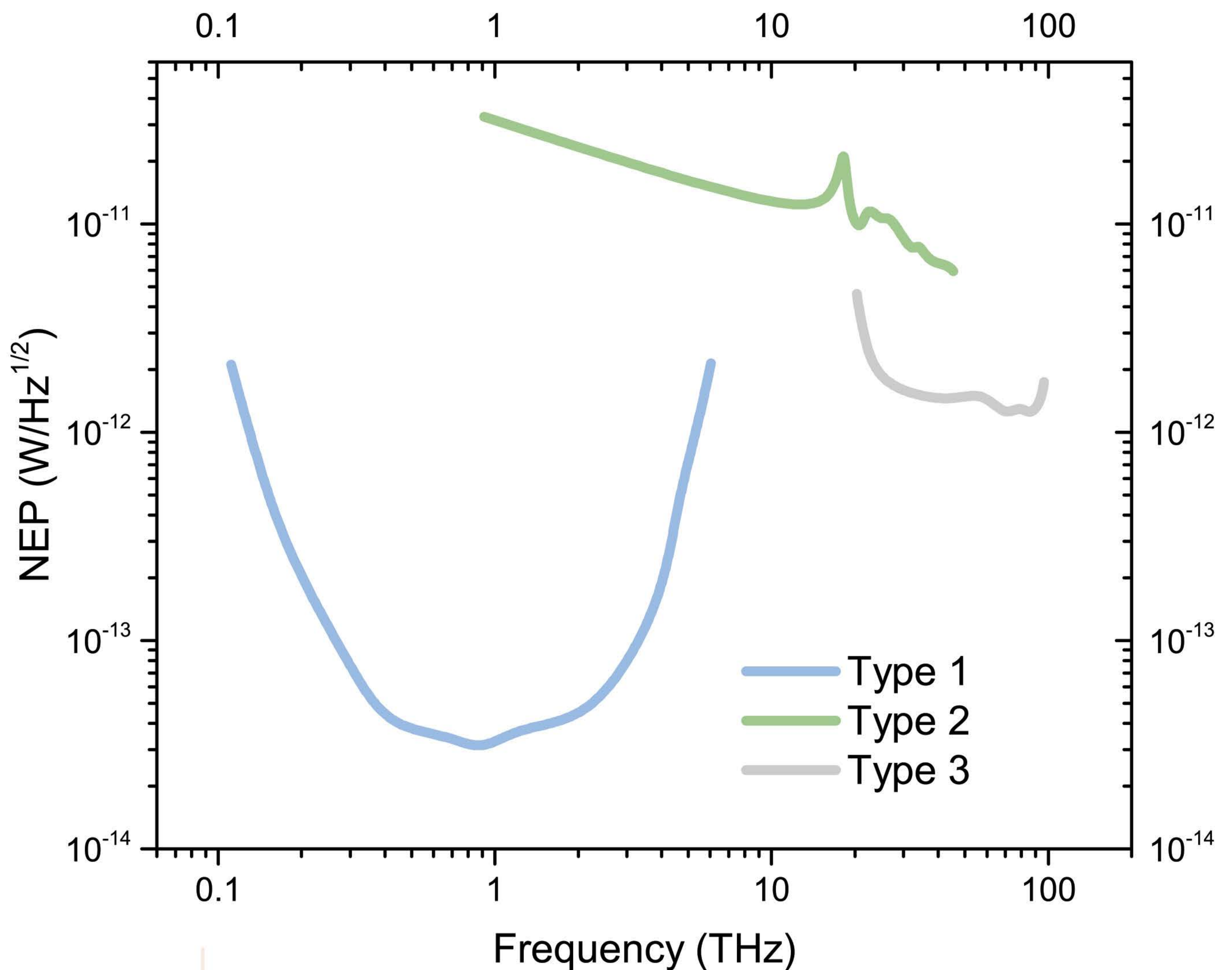
**Closed-cycle cryostats** are refrigerators based on the Gifford-McMahon cycle. Simple and stable long-term operation. Up to two detector channels. Operation range and response time are to be customized upon a request.

**LHe cryostats** are a convenient option if you work with liquid helium. Light and portable, they can easily fit into an experimental setup. Up to two detector channels. Operation range and response time are to be customized upon a request.



## HEB CONFIGURATIONS

The following data represents available HEB configurations and its parameters



If none of the configurations met your requirements we propose fabrication services for special HEB devices that could employ different superconducting materials or unique antenna layout.

Type	1	1a	1b
Frequency range (THz)	0.3-3 – optimal frequency range (3 dB flatness) 0.1-6 – full frequency range		
Upper level of dynamic range ( $\mu\text{W}$ at 3dB compression point) <sup>-1/2</sup>	0.1 <sup>-14</sup> <sup>-13</sup> <sup>-13</sup>		
Noise equivalent power (NEP), W/Hz	5-7 · 10	3-5 · 10	5-8 · 10
Responsivity of the bolometer, (V/W) <i>intrinsic characteristic of the HEB</i>	~10,000	~ 3,000	~ 2,000
Response time (ns)	~1	~0.1	~0.05
Sensitive material	MoRe	NbN	
Bandwidth of HEMT amplifier (MHz)	0.01-200	1-3500	1-8000
Maximum power handling capacity	50 $\mu\text{W}$		
Lens configuration	Hybrid antenna ( $\varnothing$ 12 mm silicon hyperhemispherical lens and logarithmic periodic spiral antenna)		
Input beam Max diameter (mm)	10		
Beam pattern	F/3 to F/ $\infty$ (collimated)		
Type	2	2a	
Frequency range (THz)	1-12 (40)		
Upper level of dynamic range ( $\mu\text{W}$ at 3dB compression point) <sup>-1/2</sup>	50 <sup>-11</sup> <sup>-11</sup>		
Noise equivalent power (NEP), W/Hz	1-2 · 10	6-8 · 10	
Responsivity of the bolometer, (V/W) <i>intrinsic characteristic of the HEB</i>	~300	~ 100	
Response time (ns)	~1	~0.1	
Sensitive material	MoRe	NbN	
Bandwidth of HEMT amplifier (MHz)	0.01-200	1-3500	
Maximum power handling capacity	10 mW		
Lens configuration	Silicon lens ( $\varnothing$ 12mm or $\varnothing$ 4mm silicon hyperhemispherical)		
Input beam Max diameter (mm)	10 (3)		
Beam pattern	F/3 to F/ $\infty$ (collimated)		
Type	3	3a	
Frequency range (THz)	25-100		
Upper level of dynamic range ( $\mu\text{W}$ at 3dB compression point) <sup>-1/2</sup>	2 <sup>-12</sup> <sup>-12</sup>		
Noise equivalent power (NEP), W/Hz	1-2 · 10	4-5 · 10	
Responsivity of the bolometer, (V/W) <i>intrinsic characteristic of the HEB</i>	~2,000	~ 500	
Response time (ns)	~1	~0.1	
Sensitive material	MoRe	NbN	
Bandwidth of HEMT amplifier (MHz)	0.01-200	1-3500	
Maximum power handling capacity	1 mW		
Lens configuration	Germanium or zinc selenide lens ( $\varnothing$ 12 mm germanium hyperhemispherical)		
Input beam Max diameter (mm)	10		
Beam pattern	F/3 to F/ $\infty$ (collimated)		