



Basel Precision Instruments



Cryogenic Microwave Filter and Thermalizer (MFT)

high attenuation, low microwave cutoff, strong thermalization

Model	MFT	π MFT
Connector Type	MCX	
Dimension	Length 30 mm Diameter 6 mm	
Capacitance (T = 300K / T=4.2K)	$\lesssim 5$ nF	$\lesssim 15$ nF
Resistance (T = 300K)	$\lesssim 5 \Omega$	
Resistance (T = 4.2K)	$\lesssim 50$ m Ω	
3 dB Attenuation	≈ 0.5 MHz	≈ 0.3 MHz
25 dB Attenuation	≈ 8 MHz	≈ 1 MHz
100 dB Attenuation	≈ 130 MHz	≈ 30 MHz

Microwave filtering and thermalization of signal wires are two critical ingredients in setting up a sensitive low-temperature experiment, such as quantum transport measurements.

BASPI offers two types of compact cryogenic microwave filters that unite unmatched thermalization of the wires with ultra-strong microwave attenuation: The standard microwave filter/thermalizer (MFT) and the π MFT.

The standard MFT consists of a copper wire embedded into a highly conductive silver matrix to ensure optimal thermalization. The π -MFT is identical to the standard MFT, but equipped with an additional pair of discoidal capacitors, resulting in an improved microwave suppression.



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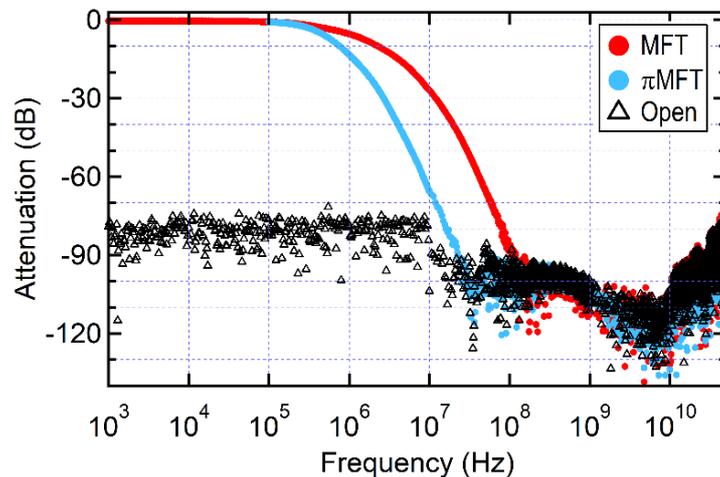
Applications

Low-temperature milli-Kelvin and sub-milli-Kelvin experiments, such as those performed in a cryogenic or cryogen-free dilution refrigerator.

Quantum transport experiments requiring ultra-cold electron temperatures.

MFT and π MFT Transmission Spectrum

The attenuation spectra of an MFT (red) and a π MFT (blue) is shown below. The measurements are performed with a signal analyzer (1 kHz – 10 MHz) and a vector network analyzer (10 MHz – 40 GHz). Black triangles indicated the noise floor, measured with an open connection.



Customization

Customized designs are possible, e.g. packing several filters in a compact box (an example is shown in the figure below) or user-defined connector or wire types.

