



**Figure 7: Schematic diagram of the cryogenic cluster source.** The second stage of a cryocooler (Sumitomo, SRDK) is connected to a cold finger that cools down the source and a reservoir. The first pulsed valve (Parker) injects the gas into the reservoir. It stays there for 40 ms and a special pulsed valve controls its injection into the source. A silicon diode is used to measure temperature. The source and reservoir are drawn to scale. A 25-ohm heater is used to control the temperature. Brass screws are used to avoid loosening at low temperatures. The cold finger, source and reservoir are made of copper. The connection between the cold finger and source is through 30 layers of silver foil pressed together.