

I Cooling: General Results

- ① Energy spectra of cooled ~~fixed~~ detectors is indistinguishable qualitatively and quantitatively from those of good detectors ∴ cooling is very useful!!
- ② Cooling a good detector improves energy resolution by about one channel out of six FWHM. (for ^{20}Am α -particles).
- ③ Cooling a good detector with the Peltier somehow inflicts some permanent damage on the detector. The damage is manifested as a one channel out of six degradation in energy resolution.
- ④ no timing results.

II Brief History of Cooling DSSDs

- ① Cooling proposed to improve energy and time resolution.
- ② ~~the~~ thermoelectric cooling was tested to avoid complications of a recirculating liquid cooling system.
- ③ became apparent that liquid (water) cooling was required regardless to carry away the heat produced by the Peltier.
- ④ Question arises: We need liquid cooling anyways so why not eliminate the Peltier.

	Peltier / Water	Ethylene Glycol
Advantages	<ul style="list-style-type: none"> -testing complete -requires only water -could be run with water only (on new detectors) 	<ul style="list-style-type: none"> -eliminates hybrid liquid/thermoelectric system -can be used on new detectors without worry
Disadvantages	<ul style="list-style-type: none"> -Peltier should not be used on new detectors -TRIUMF water (25°C) is warmer than city water (5°C) ...up to Doug Preddy 	<ul style="list-style-type: none"> -requires recirculating liquid chiller (approx. US\$ 2300 says John Behr) -requires ethylene glycol -requires more machine-work to install than Peltier
		<ul style="list-style-type: none"> -requires testing