

## Low Temperature Physics (E/A) - physics731

<i>Course</i>	Low Temperature Physics (E/A)
<i>Course No.</i>	physics731

Category	Type	Teaching			Semester
		Language	hours	CP	
Elective	Lecture with exercises	English	3+1	6	WT/ST

### Requirements for Participation:

**Preparation:** Elementary thermodynamics; principles of quantum mechanics; introductory lecture on solid state physics

**Form of Testing and Examination:** Requirements for the examination (written or oral): successful work with the exercises

**Length of Course:** 1 semester

**Aims of the Course:** Experimental methods at low (down to micro Kelvin) temperatures; methods of refrigeration; thermometry; solid state physics at low temperatures

**Contents of the Course:** Thermodynamics of different refrigeration processes, liquefaction of gases; methods to reach low ( $< 1$  Kelvin) temperatures: evaporation cooling, He-3-He-4 dilution cooling, Pomeranchuk effect, adiabatic demagnetisation of atoms and nuclei; thermometry at low temperatures (e.g. helium, magnetic thermometry, noise thermometry, thermometry using radioactive nuclei); principles for the construction of cryostats for low temperatures

### Recommended Literature:

O.V. Lounasmaa; Experimental Principles and Methods Below 1K (Academic Press, London 1974)

R.C. Richardson, E.N. Smith; Experimental Techniques in Condensed Matter Physics at Low Temperatures (Addison-Wesley 1988)

F. Pobell, Matter and Methods at Low Temperatures (Springer-Verlag, Heidelberg 2. Aufl. 1996)

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