Name of the Partnering Organization:	**Low Temperature Laboratory** **Aalto University**	Aalto University School of Science
Location (town, country):	Espoo - Finland	
Web site address:	http://ltl.tkk.fi	

Brief description of the organization

Low Temperature Laboratory (LTL) was started in 1965 by Academician Olli V. Lounasmaa. In 10 years the laboratory became one of the international centres of low temperature research. Today it is an independent research laboratory within the Aalto University School of Science, directly under the Vice Rector of Academic Affairs. Nanoscience and nanotechnology form an important part of the LTL research agenda. Laboratory nanoelectronics research was started already in 1996 and today it covers 35% of its research activities. Since 2006 the LTL is coordinating a **national Center of Excellence in Low Temperature Quantum Phenomena and Devices**. In 2009-2013 the LTL is also serving European low temperature scientists as a transnational access facility in the EU-funded **MICROKELVIN** collaboration**, a European infrastructure network of 12 low temperature laboratories**. MICROKELVIN will offer transnational access to European users to prepare and conduct their experiments at low temperatures. The Otaniemi node of MICROKELVIN will offer annually access to about 20 European scientists to its low temperature facilities of LTL. Together with BlueFors Cryogenics (LTL spin-off company) LTL is developing 4 new He-free pulsed-tube based refrigerators, including the first pulsed-tube based nuclear cooling refrigerator.

Description of the research group

PICO group (Thermoelectric effects and quantum state engineering in nanostructures) is an internationally leading group in the highly competitive field of mesoscopic physics and quantum devices. Particular research topics include nonequilibrium in electronic nanostructures, thermometry and electronic cooling, quantum coherence in small Josephson junction devices and quantized and coherent single charge pumping. The recent results that deserve to be highlighted are the conception and demonstration of a hybrid single-electron turnstile device (Nature Physics 2008) and discovery of a new type of interferometer - Superconducting Quantum Interference Proximity Transistor (Nature Physics 2010). The group actively collaborates with several research groups of experimental and theoretical mesoscopic physics in Europe, US, and Japan.

Selected list of relevant publications

F. Giazotto, J. T. Peltonen, M. Meschke, and **J. P. Pekola**, *SQUIPT – Superconducting Quantum Interference Proximity Transistor*, Nature Physics 6, 254 (2010).

***Pekola**, J.P., Vartiainen, J.J., Möttönen, M., Saira, O.P., Meschke, M., and Averin, D.V.*
Hybrid single-electron transistor as a source of quantized electric current, Nature Physics 4, 120 (2008).

*Meschke, M., Quichard, W., and **Pekola**, J.P., Single-mode heat conduction by photons, Nature 444, 187 (2006)*

Giazotto, F., Heikkilä, T., Luukanen, A., Savin, A., and **Pekola, J.**, *Opportunities for mesoscopics in thermometry and refrigeration: Physics and applications*, Reviews of Modern Physics 78, 217 (2006).

Pekola, J. P., *Tunnelling into the chill*, Nature 435, 889 (2005)

Key researcher's CV

Jukka Pekola – Professor - Leader of the PICO research group at Low Temperature Laboratory, Aalto University. 2009 – 2011 President of the Finnish Physical Society. Over 220 articles in reviewed journals (including 2 Nature, 2 Nature Physics, 1 Reviews of Modern Physics, 45 Phys. Rev. Lett.), 8 Patents, over 80 invited talks at international conferences. Founder (1996) and a board member (1996-) of *Nanoway* company, 2005- *Nanoway Cryoelectronics.*