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Perspectives of QPACE and iDataCool — •Tilo Wettig — Department of Physics, University of Regensburg, 93040 Regensburg, Germany

I will review two recent high-performance computing projects that provide substantial compute power for lattice QCD at low cost while also addressing the growing concern about energy consumption of supercomputers. Both projects were done in close collaboration with IBM Germany. QPACE is a massively parallel machine based on the PowerXCell 8i processor, an enhanced version of the Cell processor used in the PlayStation 3. We developed a custom FPGA-based network that allows for efficient communication between nearest-neighbor nodes. QPACE was number 1 on the Green 500 list and thus the most energy-efficient supercomputer in the world in 2009 and 2010. iDataCool is a standard Linux cluster for which a hot-water cooling system was developed which allows for reuse of the waste heat generated by the computer. The concepts developed within iDataCool are implemented in the SuperMUC petascale machine to be installed at LRZ. I will also discuss how the lessons learned in our projects influence the design of future supercomputers aimed at exascale performance.