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1. SENSE - Single Exosome and Nanoparticle Sizing in their Native Environment

2. Balanced Photo-Detector - description of electronics: Low Noise & Broadband Optical Detector.

3. **nanoscale holograms** - counterfeit is a growing issue that cannot be ignored: specially, the case of counterfeit pharmaceuticals that, beside money, put in risk human lives. The propose implementation of a new holographic security feature in pharmaceutical blisters that offers the authentication and track&trace of the product done by hand – held device and smart phone application.

4. ProjectQ: Software framework for Quantum Computing

5. **Qnami** develops innovative sensors made of diamond for applications where sensitivity is key. It helps researchers exploring new avenues in material and life sciences and provide the semiconductor industry with analytical tools for design testing and debug. The sensors are used to measure magnetic fields, temperature and pressure. They are non-invasive and can operate in all types of environment.

6. **Basel Cryogenics** started in 2014 as a qstarter project from NCCR QSIT, a platform created by ETH Zürich to bring lab inventions into the world. Today, BaselCryogenics operates within the quantum coherence lab, located at the University of Basel. As such we profit from all the experience and expertise collected there in the last decade in cooling nanoscale devices down to the millikelvin regime.

7. **quantum awesomeness** - game to benchmark quantum computers - new prototype quantum processors are now announced every few months. But it is often difficult to determine how these devices compare. For this reason, a new game was developed for benchmarking software for prototype processors. This is done by implementing a simple puzzle game, designed run on any near term device.

8. **Software package for spatial light modulation** - digital micromirror devices (DMD) allow to flexibly tailor optical beams with many applications in science, industry, and society as for example in movie theatres. In this research, they shape laser light to imprint small optical potentials on ultracold atoms. Such tiny structures require holographic techniques to control both amplitude and phase of the light field. A direct method to generate holograms for DMDs to obtain a desired pattern.

9. Quantum Journal - co-founded a peer reviewed journal for quantum science. <u>http://quantum-journal.org</u>. Quantum Journal is an open-access peer-reviewed journal for quantum science and related fields. Quantum is non-profit and community-run: an effort by researchers and for researchers to make science more open and publishing more transparent and efficient.

10. QU-FAST- a device dedicated to Fast Quantum Signal Processing

The implemented field-programmable gate array (FPGA) based device performs quantum signal processing operations much faster than possible on a PC, thereby quantum physicists gain time by minimizing the wait times between consecutive measurements. 11. **GsenS**: Using world's thinnest material, Graphene, a sensing solutions has been developed that offers high-sensitivity, low-cost, robust and possibly disruptive magnetic field sensing solutions for space, automotive, consumer electronics industries. Additional unparalleled advantages of this solution are transparency, flexible & light weight.