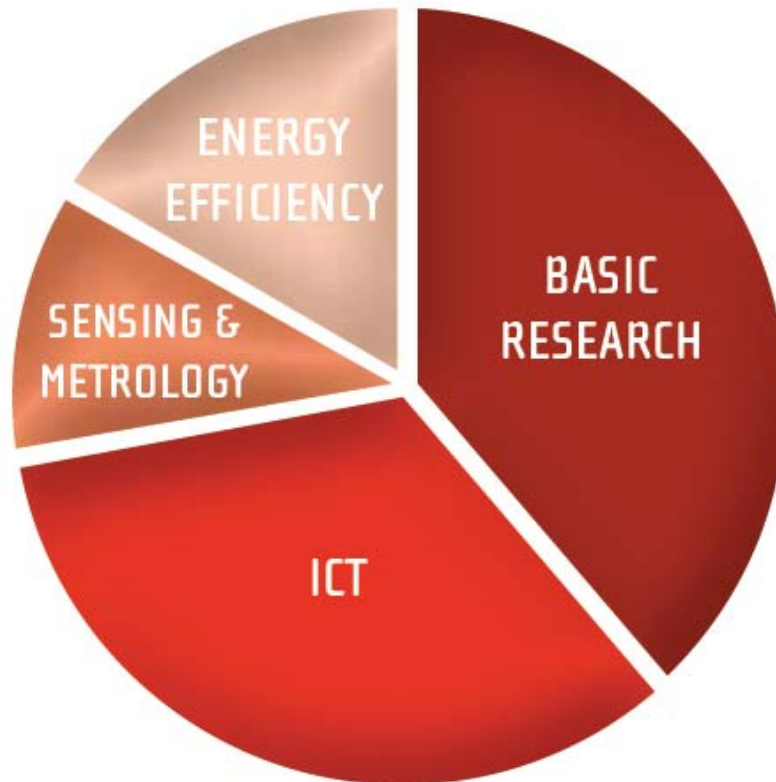


Nonlinearities and Ultrafast Processes in Nanostructured Media

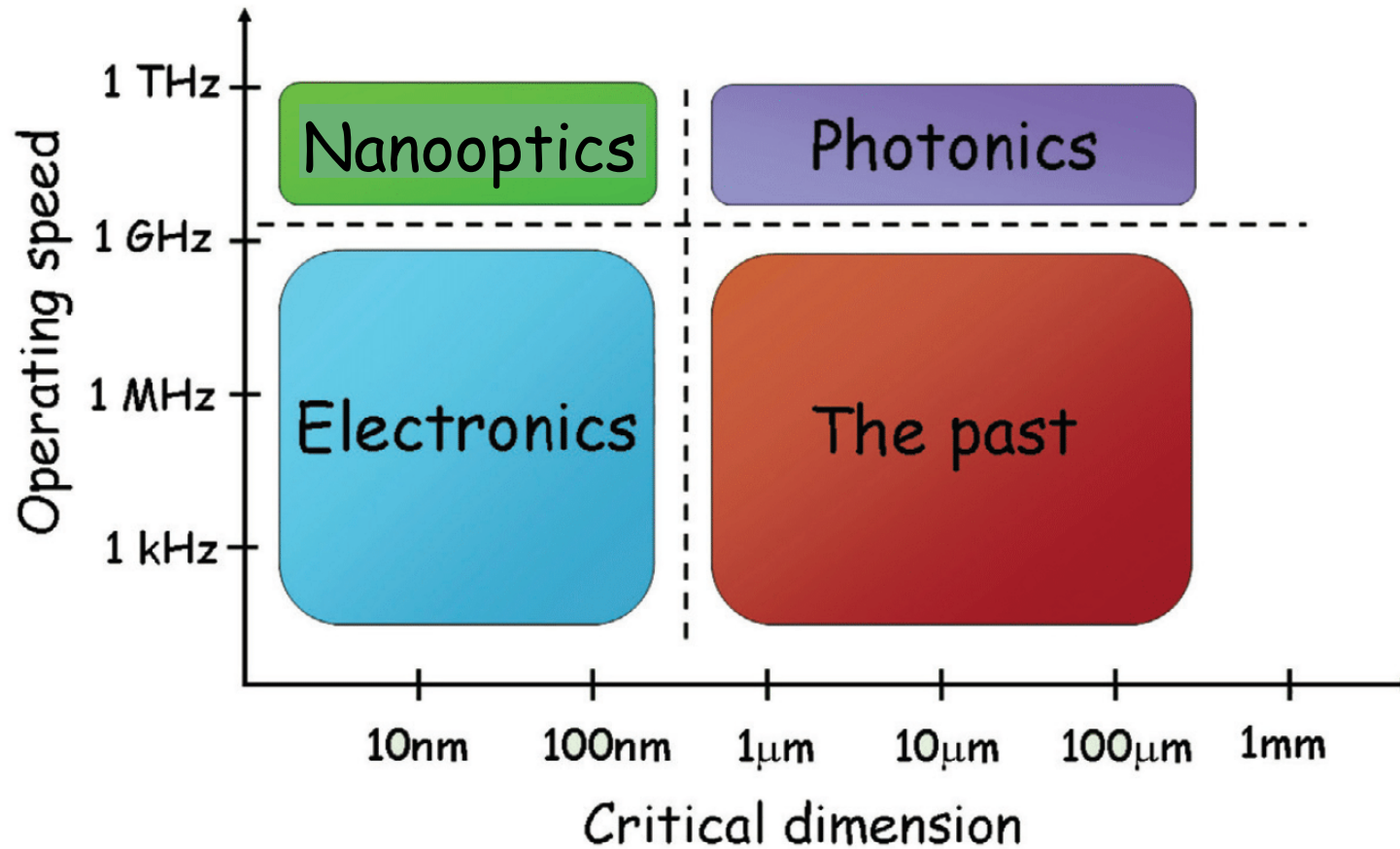
COST MP1403

Work Group 2

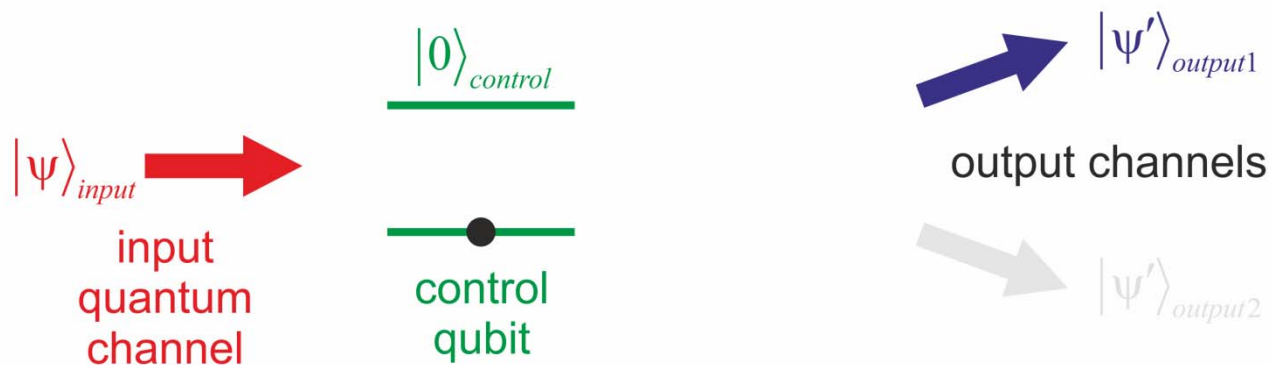
Walter Pfeiffer, Bielefeld University, Germany



Zia et al., *Materials Today* 9 (2006) 20.



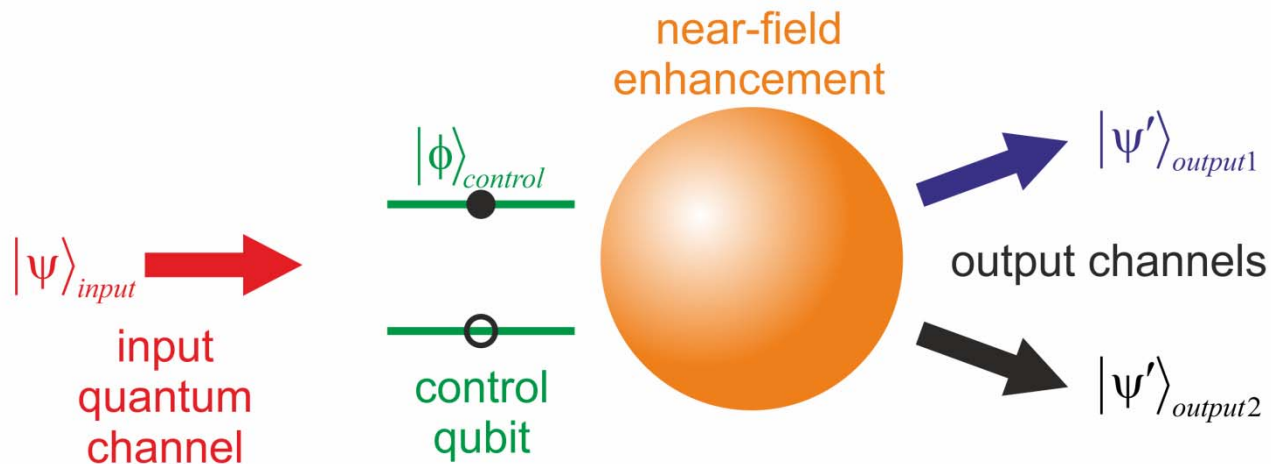
For example for single quanta switching capability (nonlinearity)



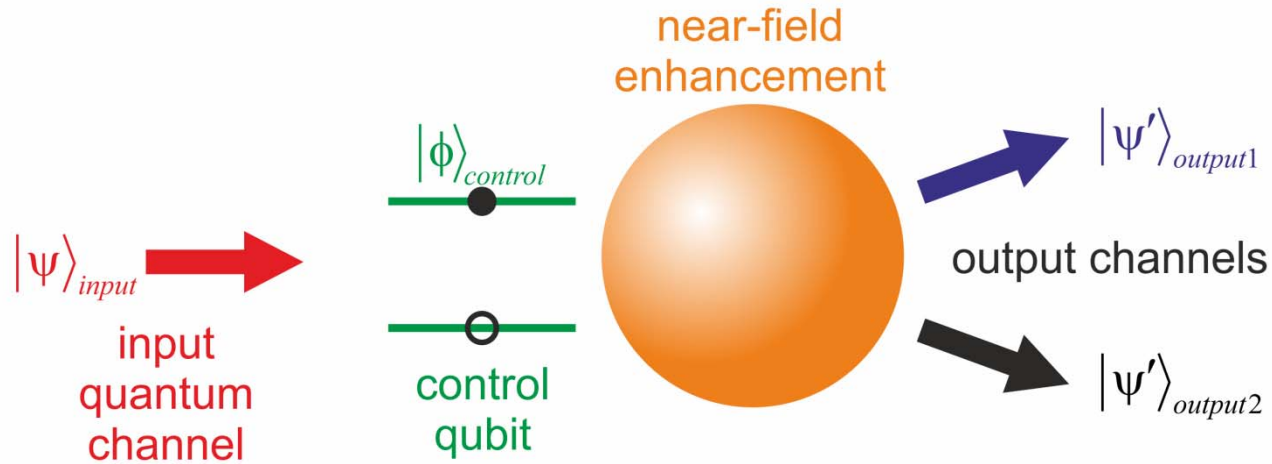
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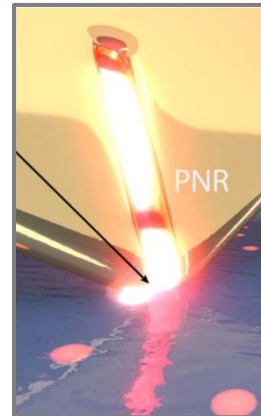
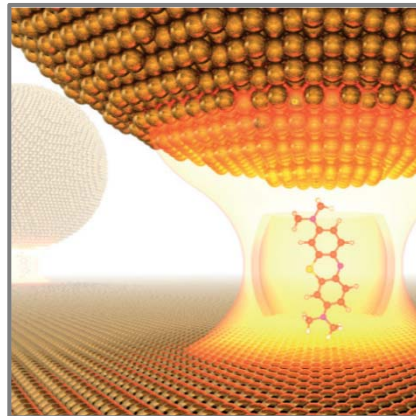


For example for single quanta switching capability (nonlinearity)



Ultrafast dynamics via strong coupling:

$g \sim 100 \text{ meV} \rightarrow 40 \text{ fs}$



Chikkaraddy et al., *Nature* 535, 127-130 (2016)

Groß et al., *Sci. Adv.* 4, eaar49082 (2018)

- *Coherent control at the nanoscale*
- ***Nanoemitters and nanoantennas***

Goals

- *Minimization of dissipation*
- *Long-lived dark mode resonances*
- *Controlled coupling to single-QEs*
- *Self-organized assembly of nanoantenna-QE structures*
- *Precise positioning/growth of QEs*
- ...

- *Coherent control at the nanoscale*
- ***Nanoemitters and nanoantennas***
- *Nanoscale nonlinear response*
- *Coherent spectroscopy on the nanoscale*
- *Active nanophotonics*
- *Nanoscale transport*
- *Strong-field phenomena in nanosystems*

- *Coherent control at the nanoscale*
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- **Kick-Off Meeting 2015 in Belgrade, Serbia**
- **WG2 Meeting 2015 in Bad Dürkheim, Germany**
joint with 4th Int. Workshop on Ultrafast Nanooptics
- **NQO WG2 – WG3 Joint Workshop 2016 in Marseille, France**
- **Mini-Colloquium “Nanoscale Quantum Optics” at CMD26 2016**
Groningen, The Netherlands
- **Training School on Multi-dimensional Spectroscopy 2017**
in Prague, Czech Republic
- **Joint Sessions at the EOS Topical Meeting on Optics at the Nanoscale and WG Meeting 2017 in Anacapri, Italy**
- **Nanoscale Quantum Optics Conference and MC Meeting 2018 in Prague, Czech Republic**

- **STSMs, ...**