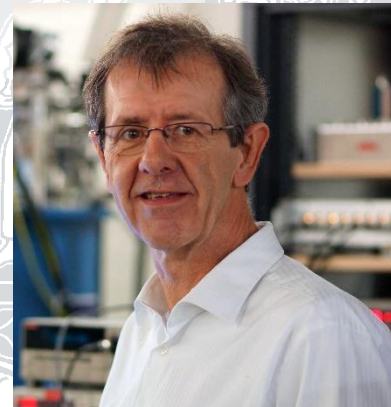


# Großes Physikalisches Kolloquium an der Universität zu Köln



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## Cooper pairs are nice, but split ones are even nicer! Why it is important to “unpair” a Cooper pair

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16<sup>30</sup> Uhr

HS III

An elegant concept for the creation of entangled electrons in a solid-state device is to split Cooper pairs by coupling a superconductor to two parallel quantum dots in a Y-junction geometry. Cooper pair splitting (CPS) was investigated in recent years in devices based on semiconducting nanowires and carbon nanotubes. I will first review these experiments and demonstrate that high splitting efficiencies  $> 90\%$  can be achieved.

A high CPS efficiency is a prerequisite for Bell state measurements, a clear way of proving that Cooper pairs can be extracted coherently, leading to spatially separated entangled electron pairs. My aim is to present a journey in research that started around 12 years ago in my lab. It shows how scientific research evolves, where one often takes detours and where one constantly must reflect the finding in the lab based on either physical intuition (simple minded models) or, if available, good theory.

