

Prof. dr. P.W.H. Pinkse (UT), SMOKE

English scientific summary

The increasing complexity of digital networks on which society depends renders these networks increasingly vulnerable to attacks. Focusing on physical layer security, we propose to develop single-spatial-mode optical Physical Unclonable Functions (PUFs) as an authentication solution for quantum and classical communication links. These novel PUFs are read out through standard optical fibers or free-space links. Several implementations of single-mode PUFs are proposed exploiting the time / frequency domain for the encoding challenge / response space. Together with the PUFs, we will develop tools to generate challenge-forming few-photon light pulses and to validate PUF responses at the few-photon level and take specific steps toward wide implementation.

English public summary

We apply Physical Unclonable Keys to secure the hardware of sensitive communication networks, in particular fiber and free-space links. We aim to develop a highly secure and practical authentication system based on optical quantum-readout of physical keys, where the challenge-response mechanism operates in the time-frequency domain.

Dutch public summary

Wij willen fysieke sleutels gebruiken om de hardware van gevoelige communicatienetwerken, i.h.b. glasvezel en zicht-zicht verbindingen te beveiligen. We beogen een zeer veilig en praktisch authenticatiesysteem te ontwikkelen gebaseerd op het quantumveilig optisch uitlezen van fysieke sleutels, waarbij het challenge response mechanisme zich in het tijd-frequentie domein afspeelt.