

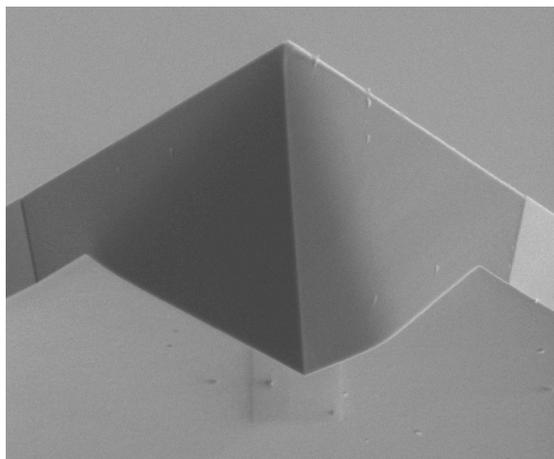
Sujet thèse / PhD subject 2026

Titre Thèse	Original Probes for Terahertz and Infrared Near Field Microscopy	
PhD Title		
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Projet phare principal		
Financement acquis	Si acquis (total ou partiel), préciser : (contrat, organisme, Université étrangère...):	
Oui <input type="checkbox"/> Non <input checked="" type="checkbox"/> Partiel <input type="checkbox"/>		
Financement demandé	Contrat Doctoral Etablissement	ULille <input checked="" type="checkbox"/> Centrale Lille <input type="checkbox"/> JUNIA <input type="checkbox"/>
	Région ou Autre <input type="checkbox"/> Préciser :	Co financement (Préciser l'origine, demande en cours, et si acquis ou pas) :

Résumé (français) / Abstract (anglais)

Abstract: Almost ten years ago, **original probes** have been designed by Tahsin Akalin. First generation probe fabricated in 2014 is shown on the SEM picture. The main idea was to take benefit of an **antenna effect** of the probe used for near field microscopy. The perfect instrument that is used for high resolution images are those developed by Rainer Hillenbrand who is one of the cofounder with Fritz Keilmann of the **NeaSpec** company (now with Attocube).

We are looking for a highly motivated PhD candidate who will work on an original approach to develop a second generation of probes at terahertz and infrared frequencies. The details will not be explained here for confidentiality. A second part of the thesis will be to study physical properties of 2D materials like **Graphene**, **hBN** and other materials. This work will be an excellent opportunity to collaborate with different research groups.



View of a first generation tip probe for IR and THz frequencies (made in July 2014)

Tahsin Akalin is an Associate Professor. He is an expert in the field of **terahertz** electromagnetic waves, photonics, **plasmonics**, near field microscopy, Planar Goubau Lines, antennas, **metasurfaces** including for **biosensing** applications and wireless communications (5G, 6G and beyond).

(h-index=24 and more than 2700 citations).

https://scholar.google.fr/citations?user=YFx_xtsAAAAJ&hl=fr&oi=ao

Rainer Hillenbrand is Ikerbasque Research Professor and Nanooptics Group Leader at the nanoscience research center CIC nanoGUNE in San Sebastian (Basque Country, Spain), and a Joint Professor at the University of the Basque Country. He is also co-founder of the company **Neaspec** GmbH, which develops and manufactures near-field optical microscopes.

(h-index=91 and more than 31 000 citations).

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