

## Colloquium recommendations: next steps into the future

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**Abstract.** We present an executive summary following the round-table discussion on the Future of Interferometry between members of the EII<sup>1</sup>, FIE<sup>2</sup>, ASHRA<sup>3</sup>, FRINGE<sup>4</sup> and IF<sup>5</sup> working groups organized on 25th September 2013 during the OHP Colloquium "Improving the performances of current optical interferometers & future designs". It was concluded that direct imaging of the planet formation process at AU-scale radii can serve as a versatile science case of broad interest in the astronomical community, which at the same time is sufficiently focussed to help developing the technical roadmap towards the next interferometric facility. Shortly after the meeting this conclusion was distilled into the *Planet Formation Imager (PFI)* project<sup>6</sup>.

A general discussion on the Future of Optical/IR Interferometry has taken place during the OHP Colloquium "Improving the performances of current optical interferometers & future designs" organized on 23-27 September 2013 (Saint-Michel l'Observatoire, France) as a continuation of the currently on going community discussions within EII, ASHRA, FRINGE and IF. The round-table participants included: J.-P. Berger, G. van Belle, L. Labadie, H. Le Coroller, J. Monnier, J.-U. Pott, M. Tallon, J. Surdej (chair). Additional participants in the conference room: P. Kern, D. Defrère, G. Duvert, F. Malbet, A. Chelli, F. Martinache, J. Kluska, S. Minardi, D. Buscher, V. Garcia, T. Ten Brummelaar, M. Creech-Eakmann, C. Haniff, M. Ireland, D. Rouan, others.

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<sup>1</sup>European Interferometry Initiative

<sup>2</sup>Future of Interferometry in Europe

<sup>3</sup>Action Spécifique Haute Résolution Angulaire, France

<sup>4</sup>Frontiers of Interferometry center in Germany

<sup>5</sup>Interferometry Forum

<sup>6</sup><http://www.planetformationimager.org/>

It was first reminded that some nine and eight years ago, two European conferences had been organized on the *Science cases for next generation optical/infrared interferometric facilities (the post VLTI era)*<sup>7</sup> and on a *Technology roadmap for future interferometric facilities*.<sup>8</sup>

Amazingly the conclusions of those two conferences established almost 10 years ago are still largely valid today. The urgency of setting up a technology roadmap was already claimed very loudly in 2004. A natural conclusion is of course that it would be totally counter-productive to again carry out a similarly long open-end exercise to define the science goals of a next-generation interferometric facility. Another good reason as to why we should move on is that the optical/IR community has been very active during the past 8 years, establishing several interferometry facility and pathfinder projects. However, most of these pathfinders come to an end, and ELTs are around the corner, probably meaning that if the interferometry community is not settling now on a strong science case for the future, which exploits the unique capabilities of interferometry, the people and groups which are capable of advancing the field will quickly disperse. As a result, the following recommendations were made:

1) In order to establish a credible roadmap for optical/IR interferometry, it was agreed that a very good, unique and common science driver ought to be identified. A very general consensus emerged that the "Planet Formation with a focus on direct observations at AU scale" should be proposed as the main science case. This does not mean that we exclude other important science cases (cf. stellar physics, AGN, ...) but most of us are convinced that a clearly focussed science case will help shaping a good and realistic technology roadmap. Issues that should be very carefully addressed now include: i) to identify the main questions in Planet Formation that can only be tackled by optical/IR interferometry observations, ii) to make sure that the breadth of the science goals matches the significant community funding effort required for any major upgrade / new facility. E.g. the capability to conduct statistically relevant (i.e. sufficiently large) surveys of planet formation at AU scale could play a big role.

2) A white book on the *Future of Interferometry* ought to be ready by 2015, just before the review of the ASTRONET science vision document for the next decades. The perfect complementarity of optical/IR interferometry with respect to other existing and future major facilities (ALMA, JWST, ELTs, SKA, ... ) should be clearly established in that white book. The authors of this article are chairing the writing of this white book, as part of the EII network activities. Interested individuals are encouraged to contact them for further information, or participation (see also the related OLBIN call for participation in fall 2012).

A major consensus at this meeting was that the community effort (including the white book) of the next two years should lead to well established, technically reachable scientific recommendations which should facilitate individual groups to

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<sup>7</sup>Proceedings of the 37th Liège International Astrophysical Colloquium (23-25 August 2004), Liège University, J. Surdej, D. Caro, A. Detal

<sup>8</sup>Proceedings of the European Interferometry Initiative workshop organized in the context of the 2005 Joint European and National Astronomy meeting 'Distant Worlds' (6-8 July 2005), Liège University, J. Surdej, D. Caro, A. Detal

work towards it by acquiring the respective funding. Current future-oriented interferometric instrumentation research struggles because such a widely accepted goal is missing. If interferometry in the optical near-infrared shall be the technology of choice for a new facility, we need to continue the way to leave the 'nice to have' niche, but establish an *only-optical/IR-interferometry-can-do-this* attitude. The VLTI second generation instrumentation, currently being put in place, and six-telescope imaging efforts at CHARA are right steps in this direction, as evinced by the talk *Science with interferometry* by O. Chesneau at the beginning of this conference.

3) It was discussed that IAU Commission 54 could help organizing a forum meeting on the topics of the Planet Formation Interferometer/Imager (PFI) during the next General Assembly. IAU Commission 54 could also help setting up an ad-hoc international steering committee with additional science and technical working groups in order to define the short term and long term science goals of future facilities addressing as many aspects of Planet Formation as possible and their corresponding top-level requirements (array architecture, size of unit telescopes, operating wavelengths, ...). Similarly, several members of the community committed to discuss the above idea and enlarge the interaction with the wider community at the upcoming SPIE in 2014, Montreal, Canada.

Shortly after the meeting these conclusions were distilled into the foundation of the Planet Formation Imager (PFI) project, please find more related information at:

<http://www.planetformationimager.org/>.