

Optical Solutions for the Ophthalmic Clinic

Presented by:



Technical Group Leadership:

E. Josua Fernandez, University of Murcia, Spain (Chair), enriquej@um.es

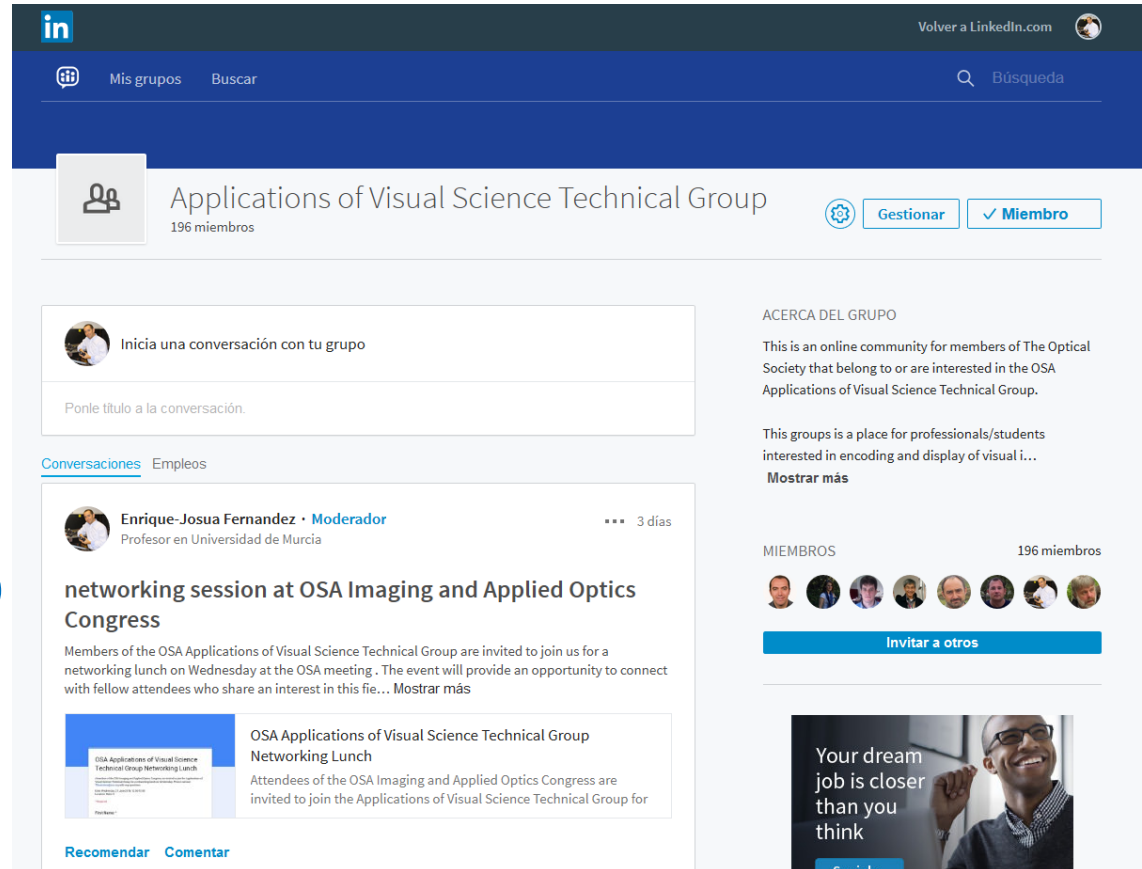
Karen Hampson, University of Oxford, UK (Vice Chair)

Juan Taberero, Anglia Ruskin University, UK (Vice Chair)



Contact your Technical Group and Get Involved!

- Linked-In site (global reach)
- Announce new activities
- Promote interactions
- Complement the OSA Technical Group Member List



Applications of Visual Science Technical Group
196 miembros

Inicio una conversación con tu grupo
Ponle título a la conversación.

Enrique-Josua Fernandez · Moderador
Profesor en Universidad de Murcia

networking session at OSA Imaging and Applied Optics Congress

Members of the OSA Applications of Visual Science Technical Group are invited to join us for a networking lunch on Wednesday at the OSA meeting . The event will provide an opportunity to connect with fellow attendees who share an interest in this fie... [Mostrar más](#)

OSA Applications of Visual Science Technical Group Networking Lunch

Attendees of the OSA Imaging and Applied Optics Congress are invited to join the Applications of Visual Science Technical Group for

ACERCA DEL GRUPO

This is an online community for members of The Optical Society that belong to or are interested in the OSA Applications of Visual Science Technical Group.

This groups is a place for professionals/students interested in encoding and display of visual i...
[Mostrar más](#)

MIEMBROS 196 miembros

[Invitar a otros](#)

Your dream job is closer than you think

networking session at OSA Imaging and Applied Optics Congress

Members of the OSA Applications of Visual Science Technical Group are invited to join us for a networking lunch on Wednesday at the OSA meeting . The event will provide an opportunity to connect with fellow attendees who share an interest in this field and to learn more about this technical group.

Please RSVP for this technical group event to let us know you will be attending:

<https://goo.gl/forms/pn8XsHRyJbxcjPNx1>

See you all soon!

J Mostrar menos



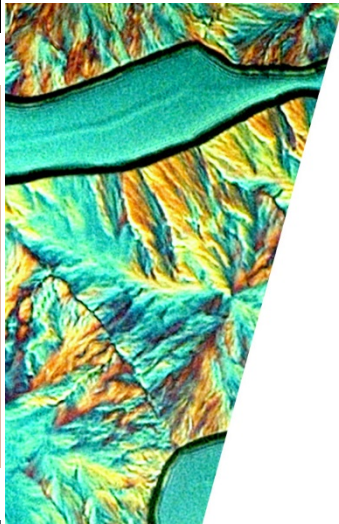
Applications of
Visual Science
Technical Group

- Emerging topics in Visual Science: which one is from your perspective worth while exploring? There is a possibility to organize a special/dedicated session in future congresses.
- Suggestions for next webinars. We have many from the executive committee, but I would love to hear yours! In this direction, I want to set (at least yearly) a webinar focused on a classical/seminal paper presented by his/her author, also to honor a career: Who are you thinking of for this year?
- Collaborations and sabbaticals: who is willing to? Let us share also funding opportunities for that.
- Any other issue you consider! Please come along, it is very important to hear your comments and suggestions.

enriquej@um.es

Send your suggestions and ideas if you are not coming

Welcome to Today's webinar!



OPTICAL SOLUTIONS FOR THE OPHTHALMIC CLINIC WEBINAR

31 May 2018 • 12:00 EDT

Dr. H. Ginis, Athens Eye Hospital, Greece

Prof. P. Artal, University of Murcia, Spain

Dr. A. Dubra, Byers Eye Institute, Stanford University USA



OPTICAL SOLUTIONS FOR THE OPHTHALMIC CLINIC WEBINAR

31 May 2018 • 12:00 EDT

OSA Applications of
Visual Science
Technical Group

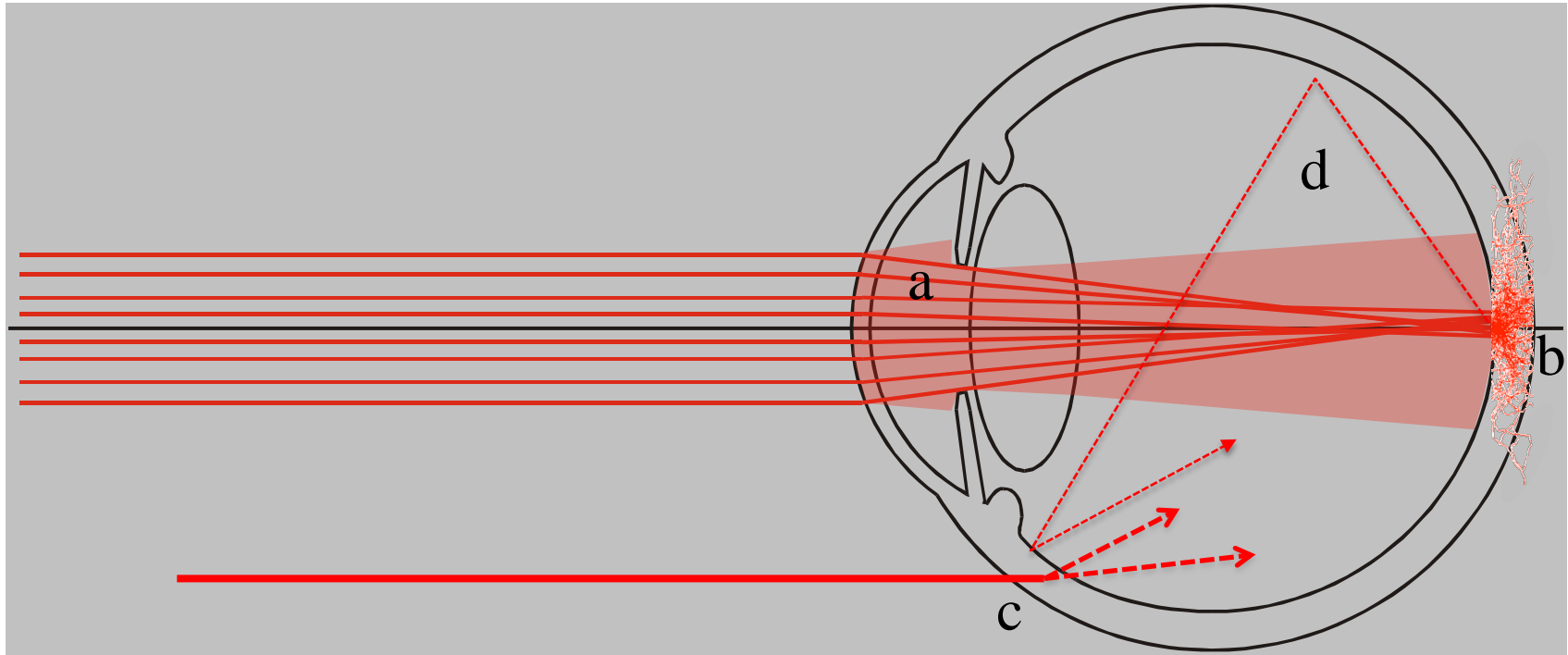
Optics for Cataracts: **New Instrument to Objectively Classify Cataracts**

Harilaos Ginis
Athens Eye Hospital, Greece

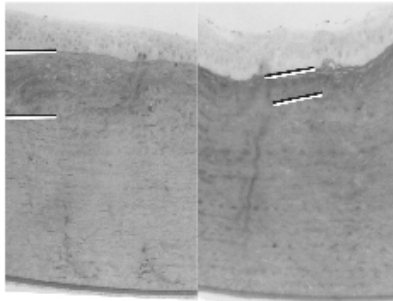
Contents

- Straylight in the human eye (mechanisms, distribution)
- Challenges in measurement
- Instrument principles
- Pre-clinical validation

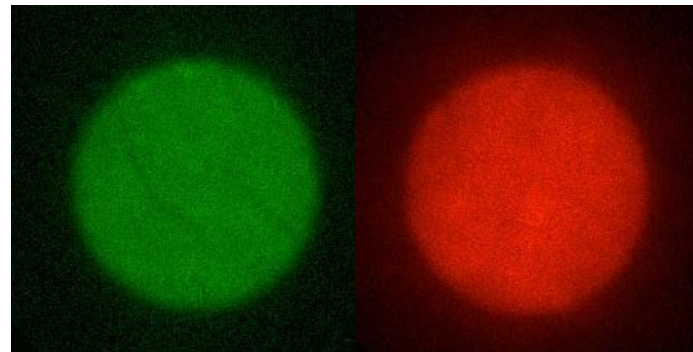
Mechanisms



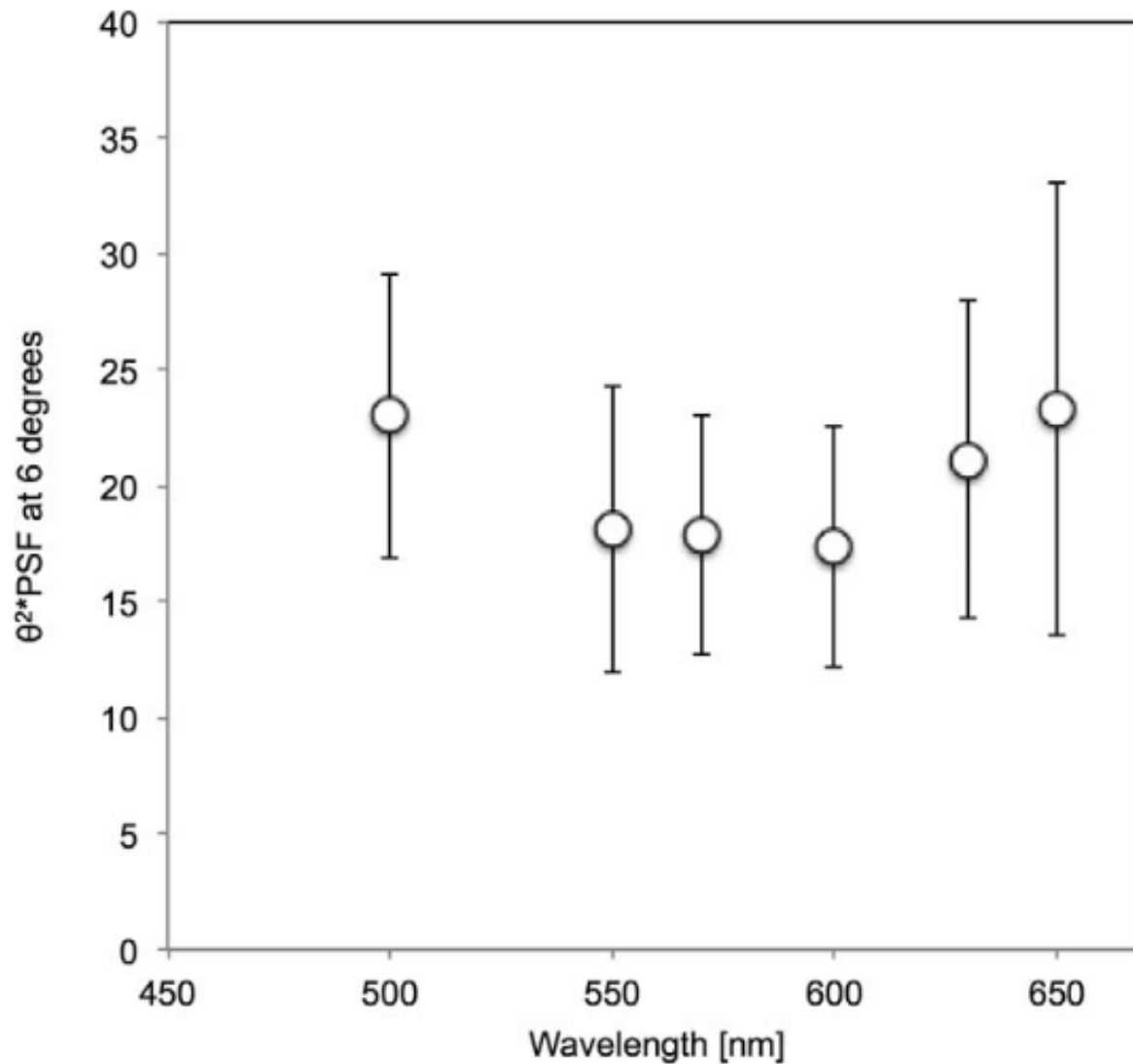
cornea



lens



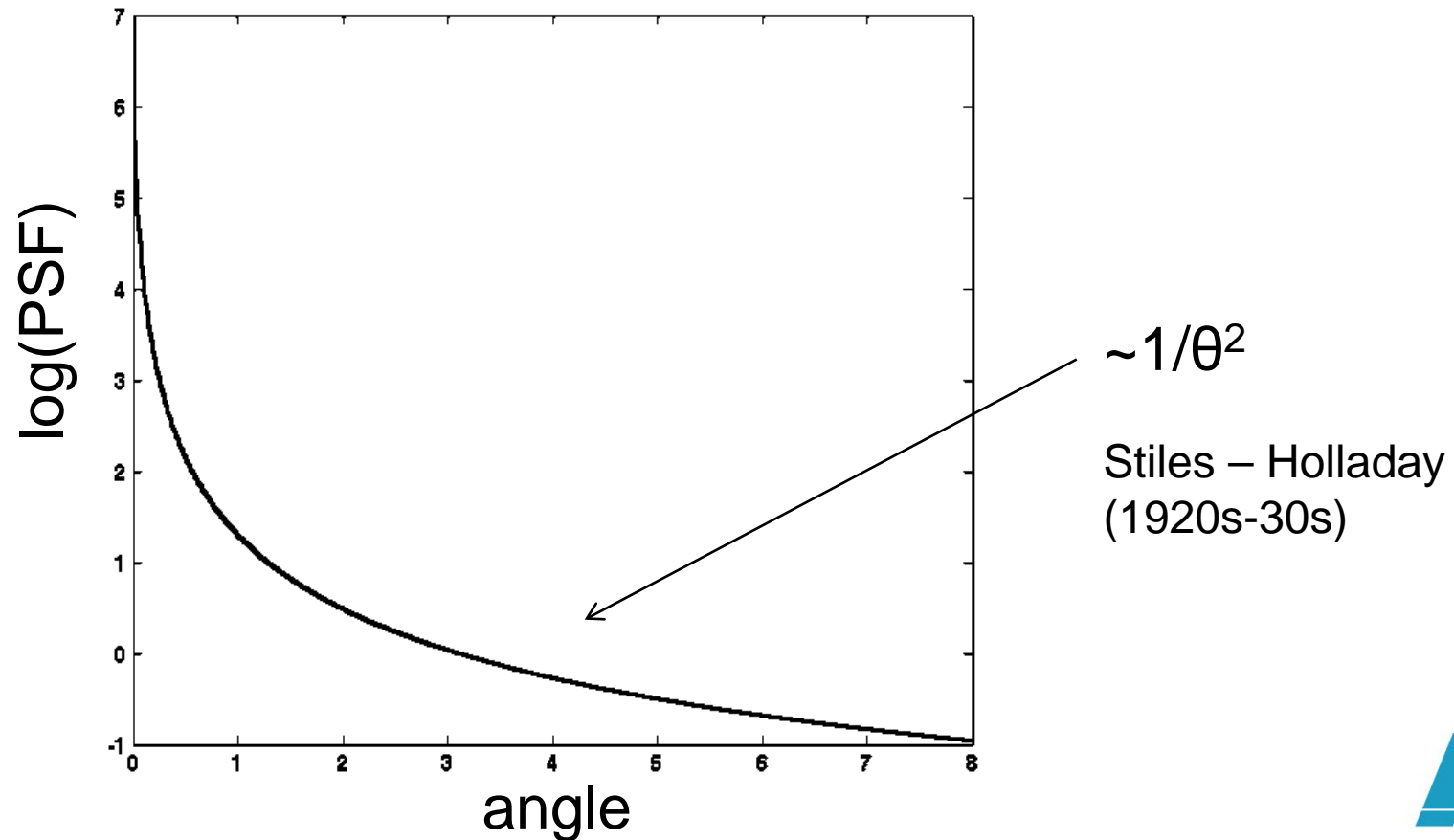
Wavelength dependence



Angular distribution of straylight / shape of PSF

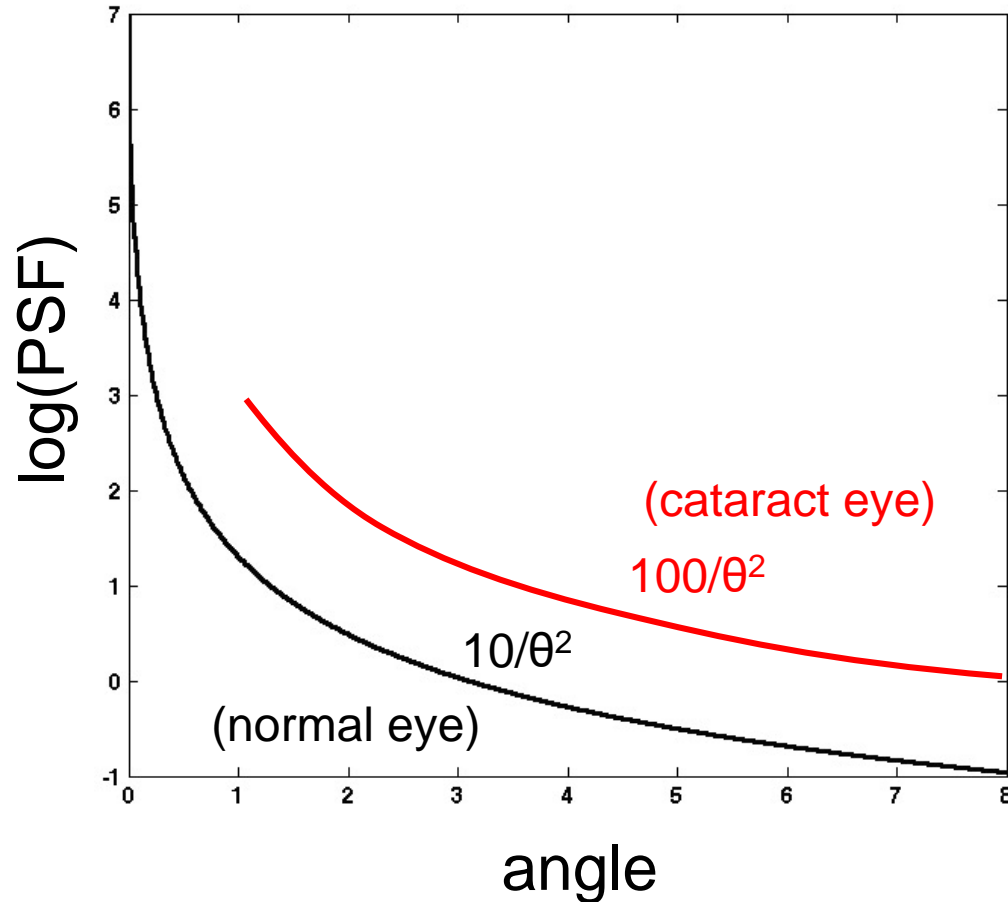
Blur
Aberrations
Resolution
Optics

conditional loss of contrast – veiling glare
scattering
glare-quality of vision
Statistics



CIE glare function: Vos and van den Berg 1999

The straylight parameter



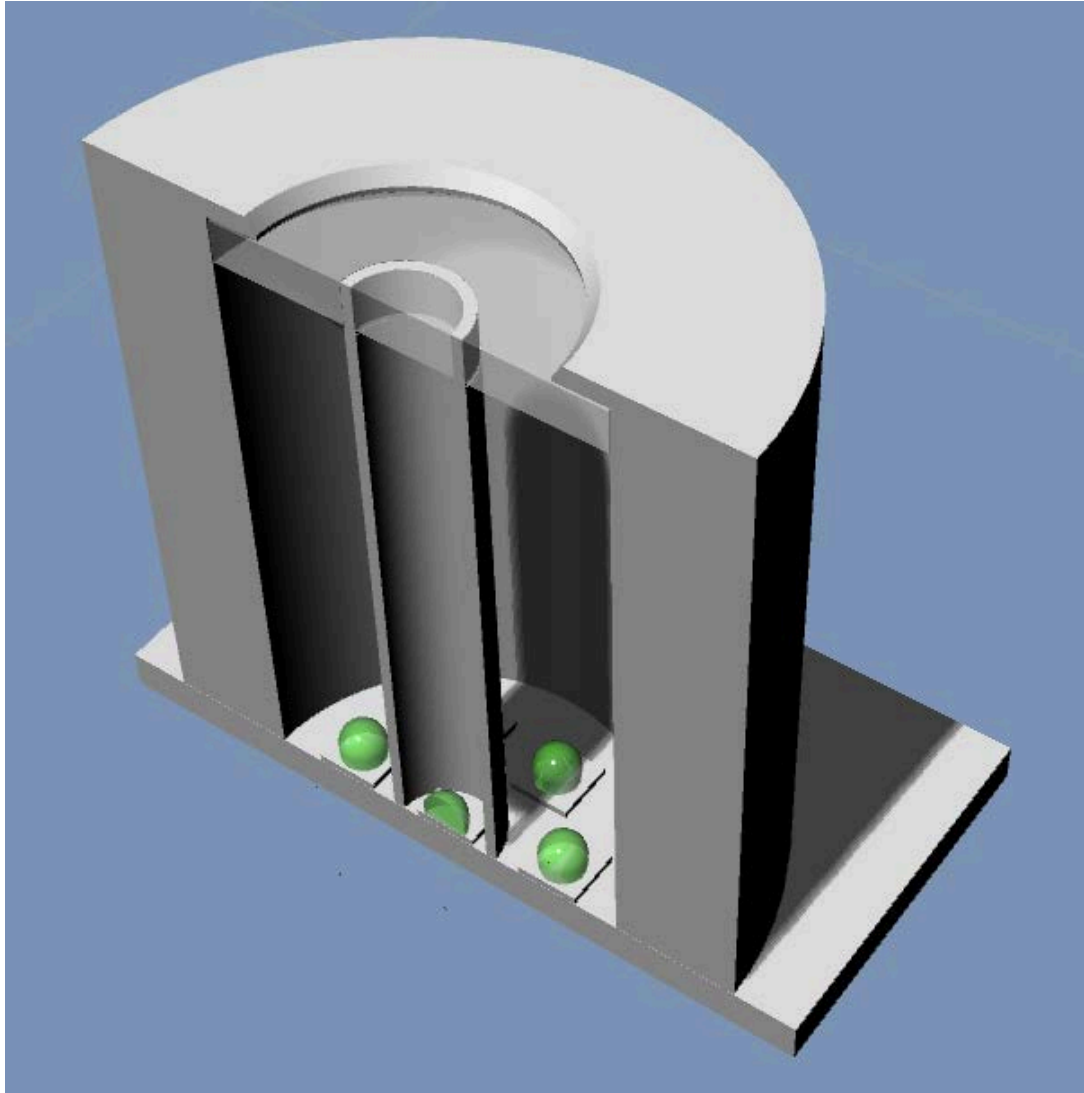
$$\text{PSF} \approx S/\theta^2, \text{ for } \theta > 3^\circ$$

S is a parameter
quantifying
straylight

Towards a compact instrument

1. Fast
2. Single parameter – fixed angle (~5 degrees, 2 zones)
3. No pupil constriction (> 4mm, after constriction from flash)
4. No pupil dilation (< 4mm, before constriction from flash)
5. Not sensitive to ambient light (modulated light)

Source geometry



Source geometry

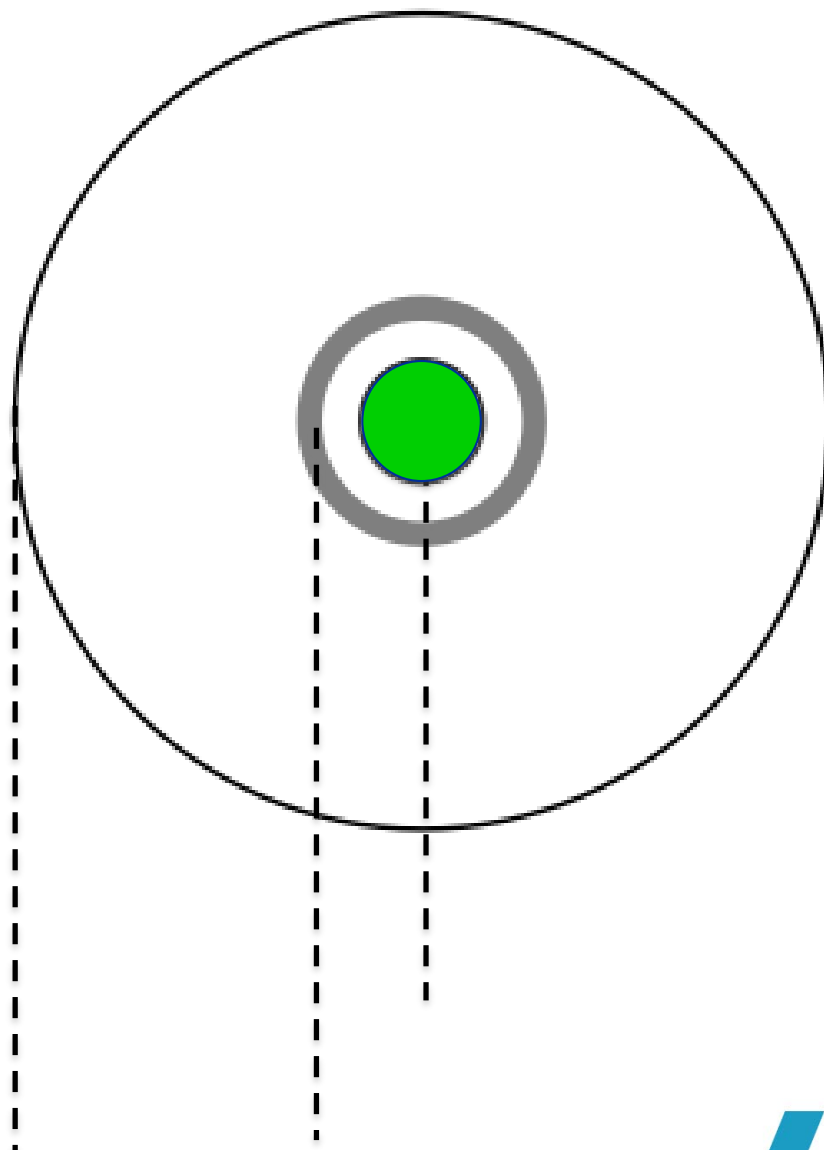
$$I_a = I_o \int_{\theta_1}^{\theta_2} 2\pi\theta PSF(\theta) d\theta$$

$$I_a = I_o \int_0^{\theta_1} 2\pi\theta PSF(\theta) d\theta$$

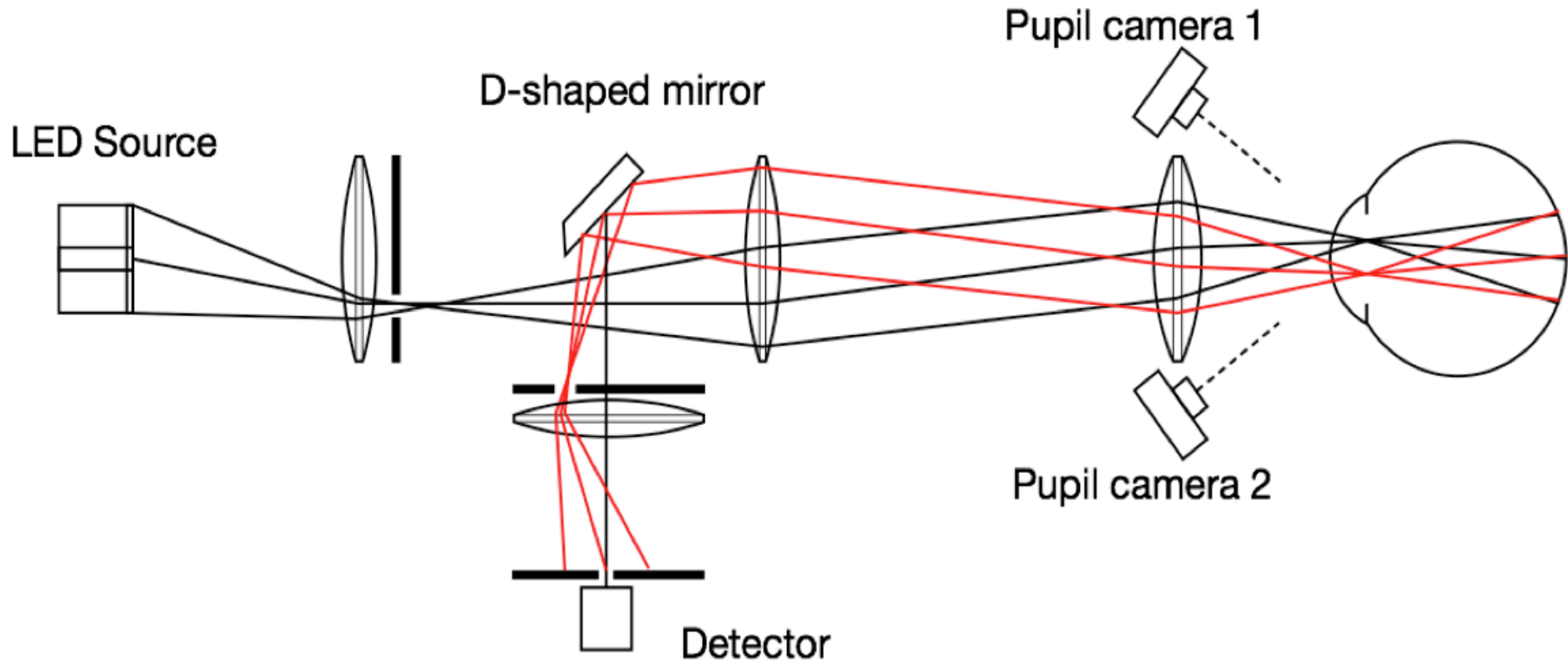
$$PSF_{dp} = \frac{1}{2\pi\theta_s} \frac{1}{\theta_2 - \theta_1} \frac{I_a}{I_a + I_d}$$

$$S_{dp} = \theta_s^2 PSF_{dp}$$

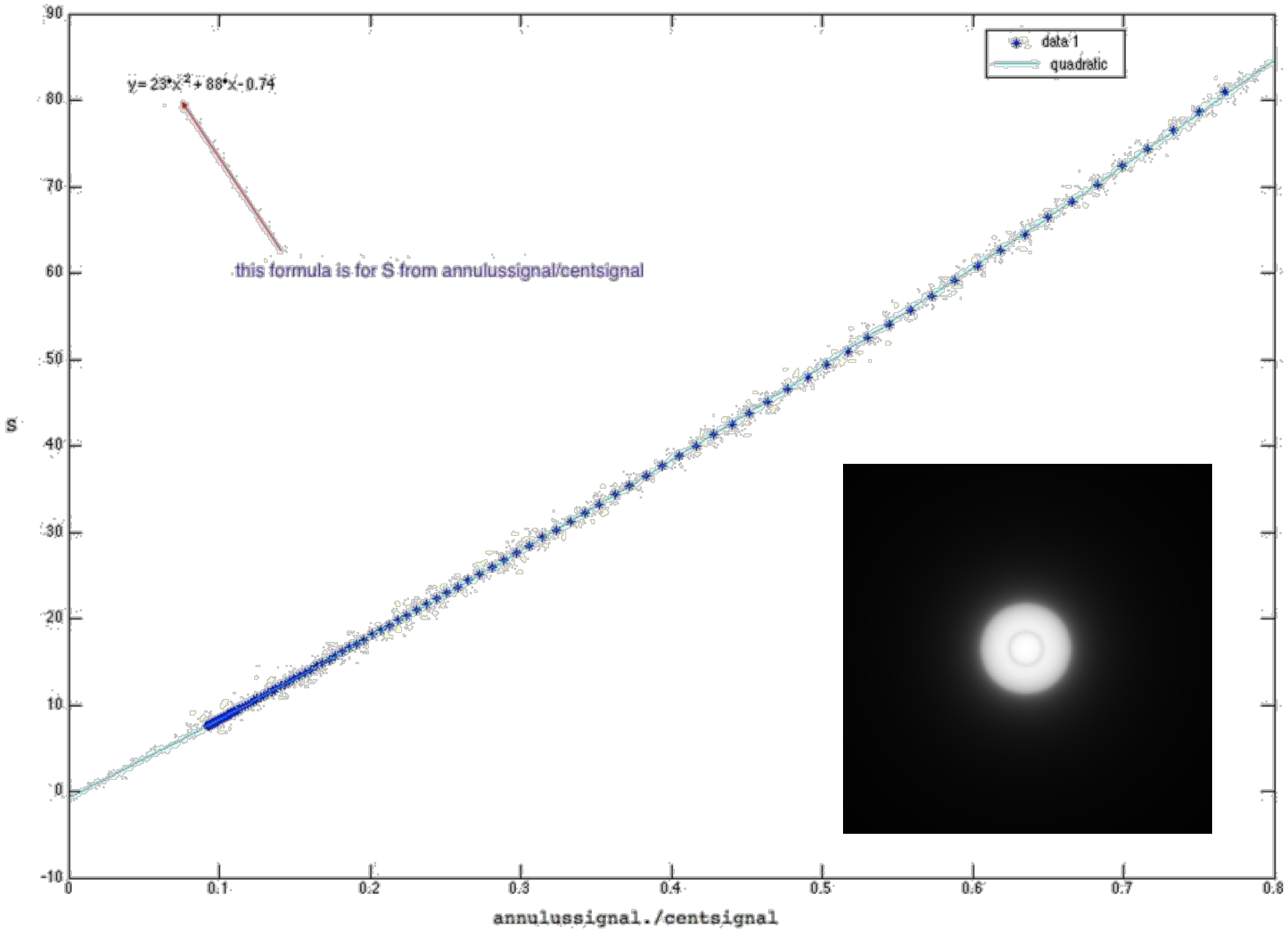
$$S = \frac{S_{dp}}{2}$$



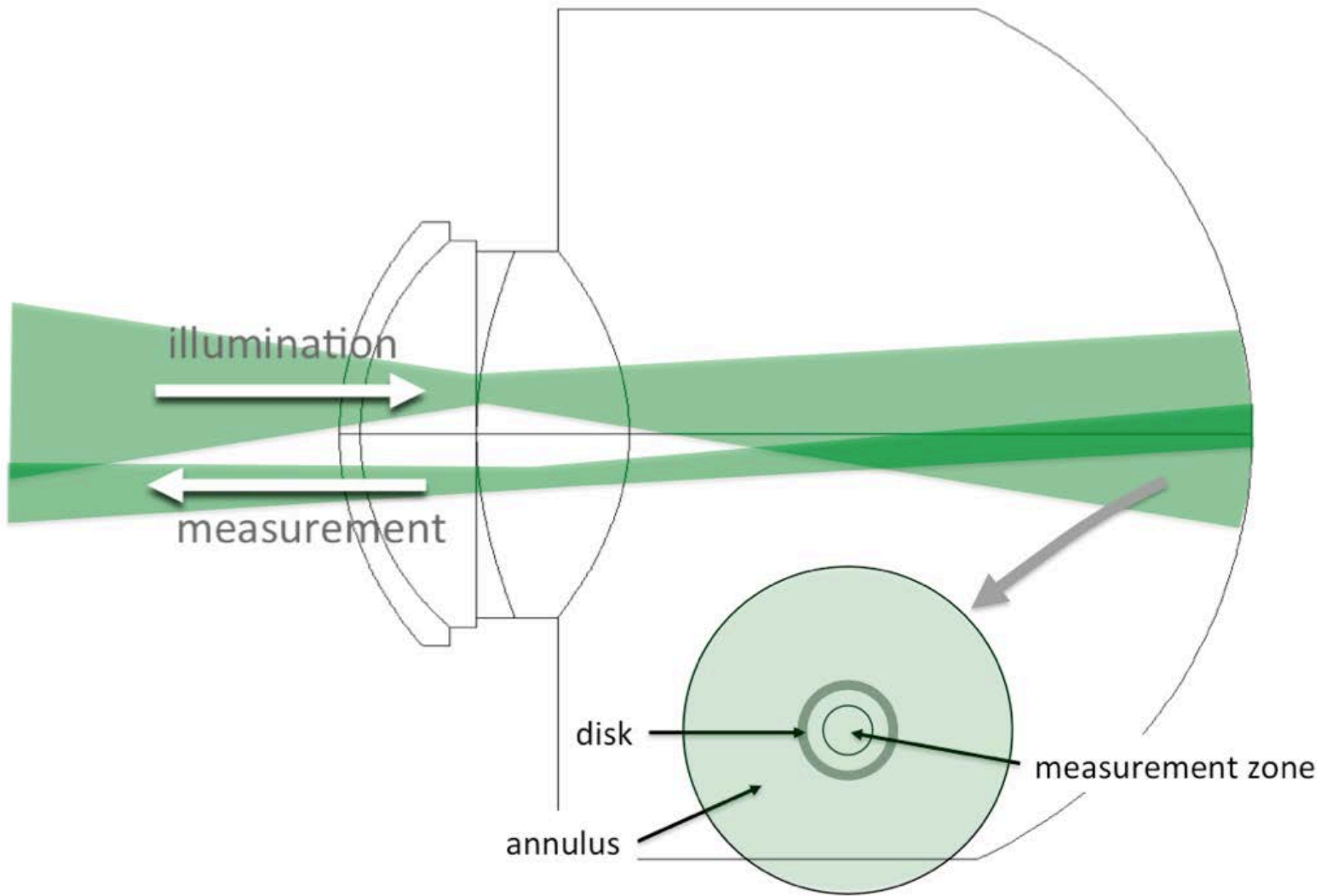
Optical setup



Numerical analysis



Illumination/measurement geometry



Pupil alignment



Far

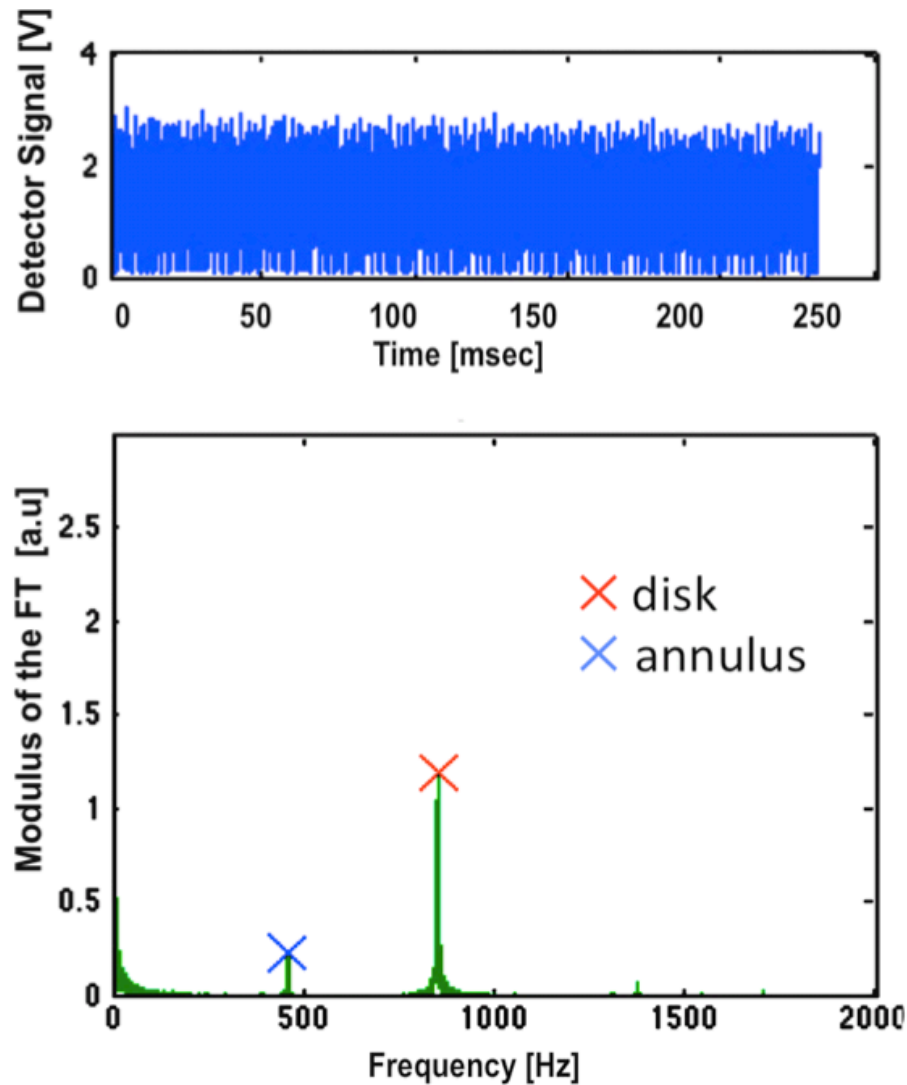


Focus

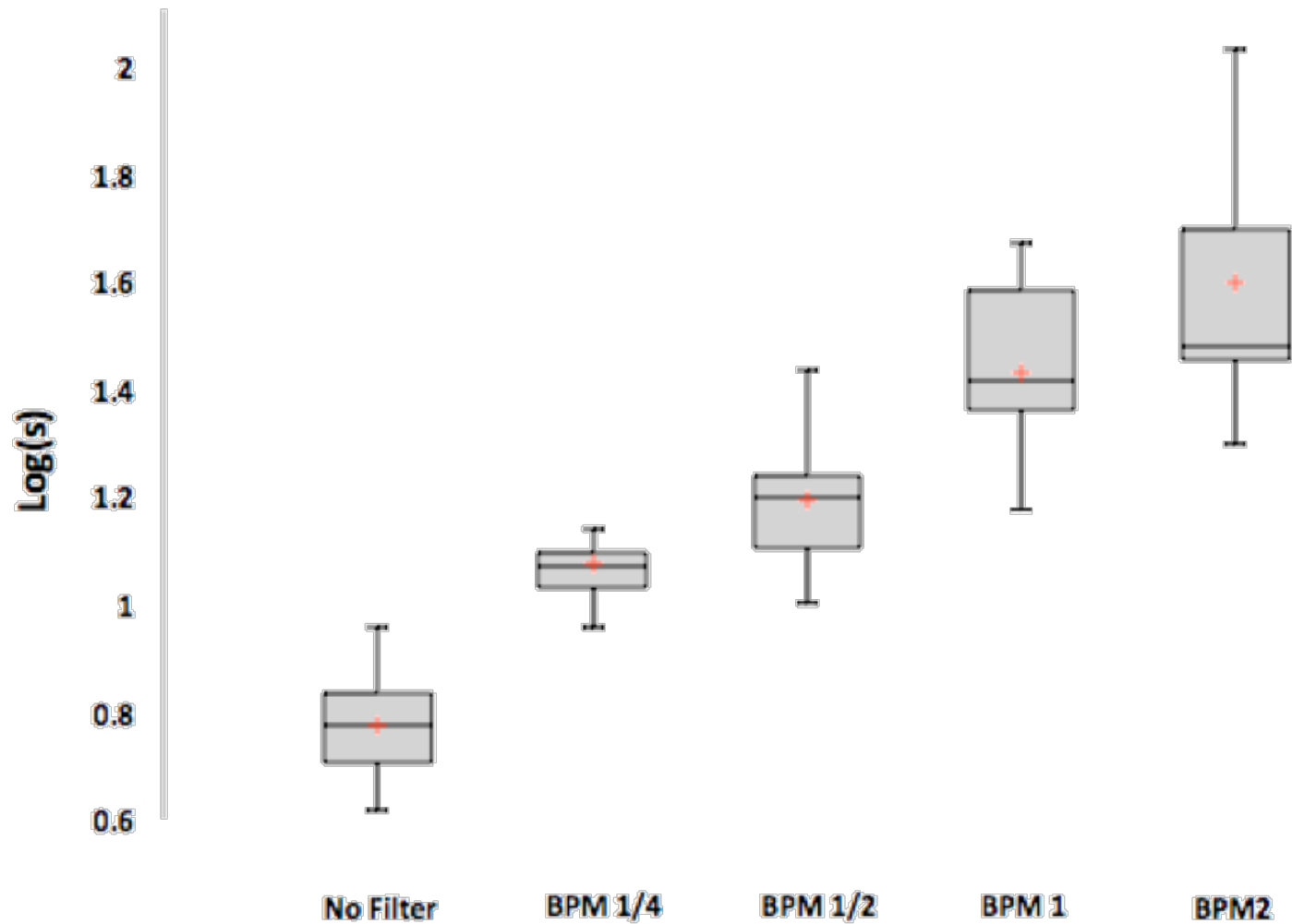


Near

Signal acquisition and analysis

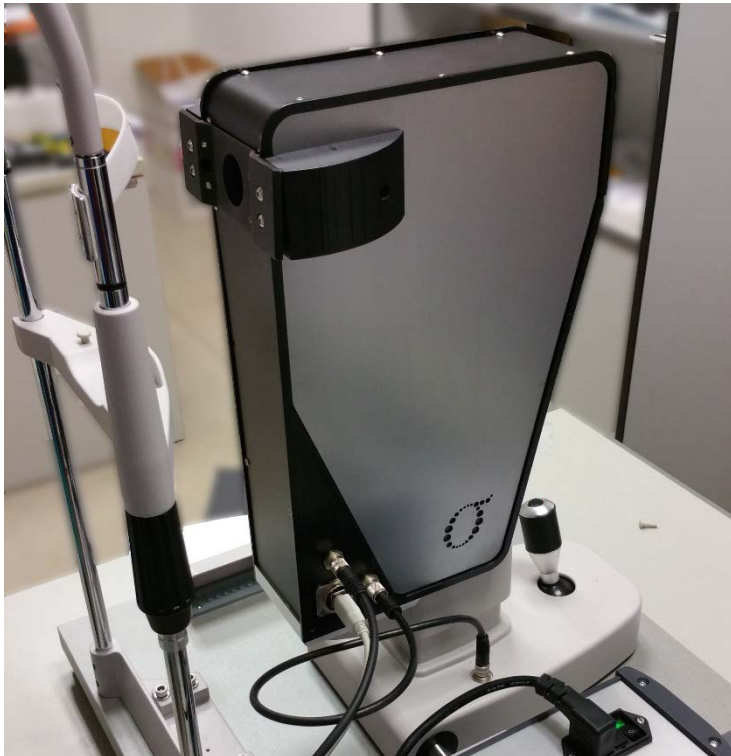


Validation with diffusing filters

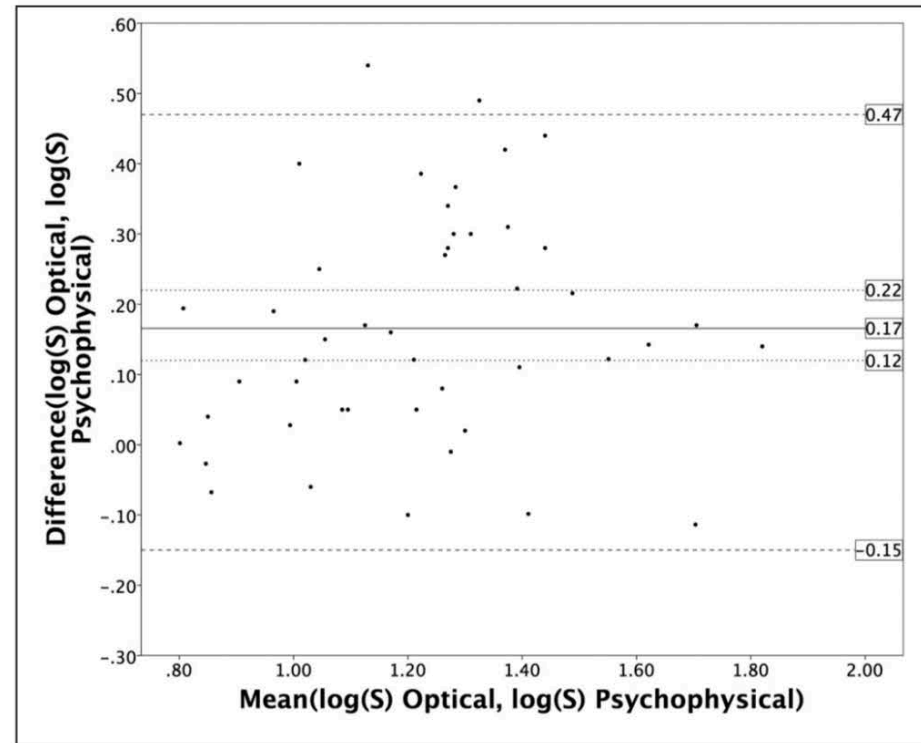
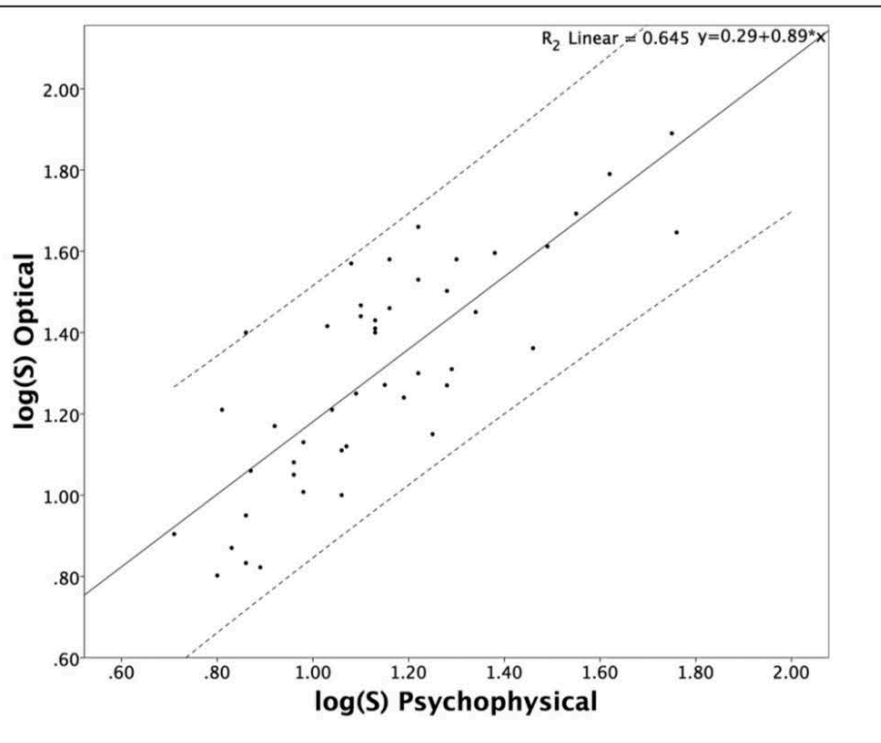


Pre-clinical validation

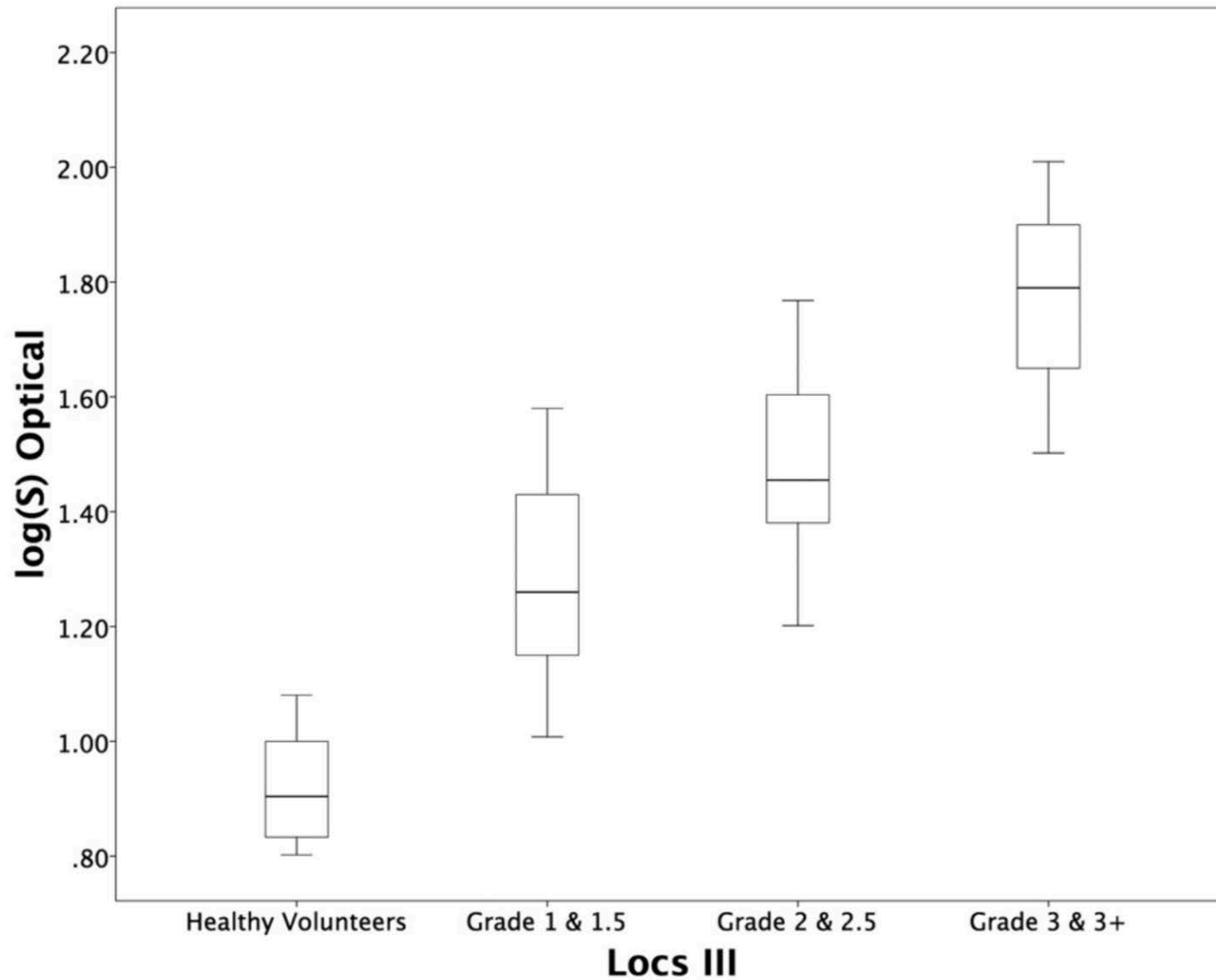
1. Cataract eyes (N=62); no other pathology.
2. Subjective grading of cataract (LOCSIII standard)
3. Psychophysical assessment of straylight (Oculus C-Quant)



Results (1)

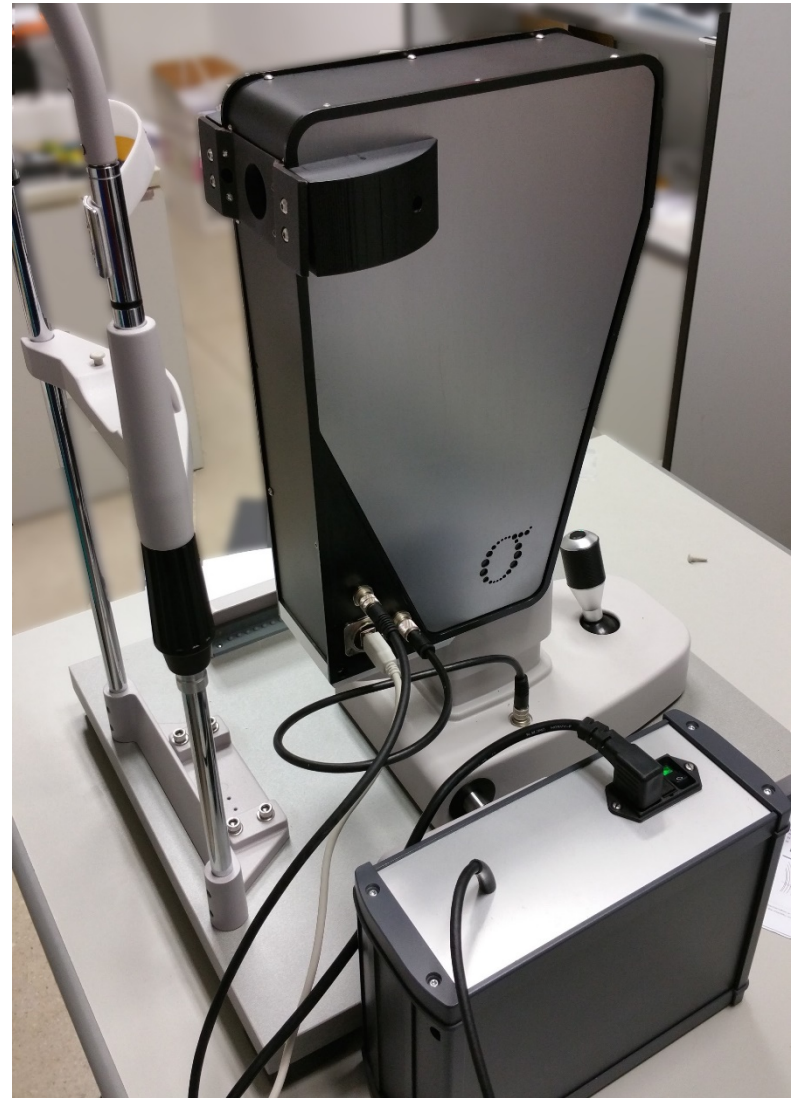


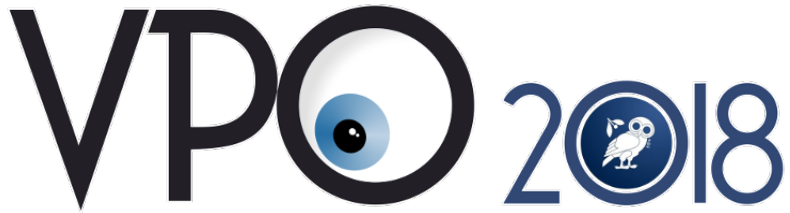
Results (2)



Conclusions

- A compact instrument for the measurement of straylight was developed
- Its main specifications (angles, wavelength etc) were determined by previous imaging studies.
- First clinical data demonstrate the suitability of the method for the classification of cataracts and the correlation of optical and psychophysical measurements.





9th European Meeting on Visual
and Physiological Optics
29 - 31 August 2018
Athens, Greece

vpoptics.net



Thank you for your attention