



# Physics Education Research (PER) projects



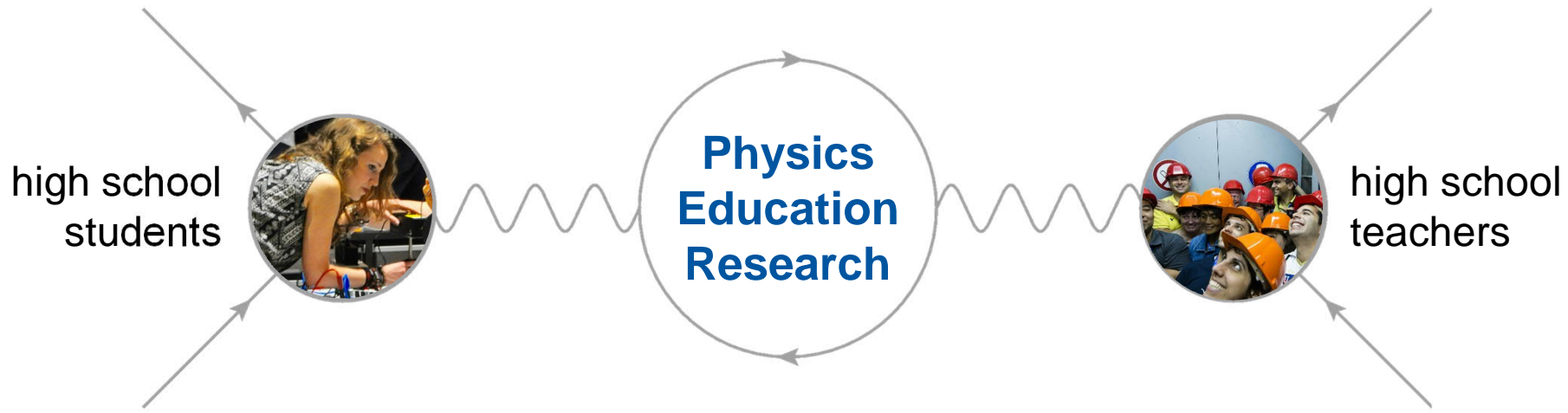
**Sarah Zöchling**

*Doctoral Student*

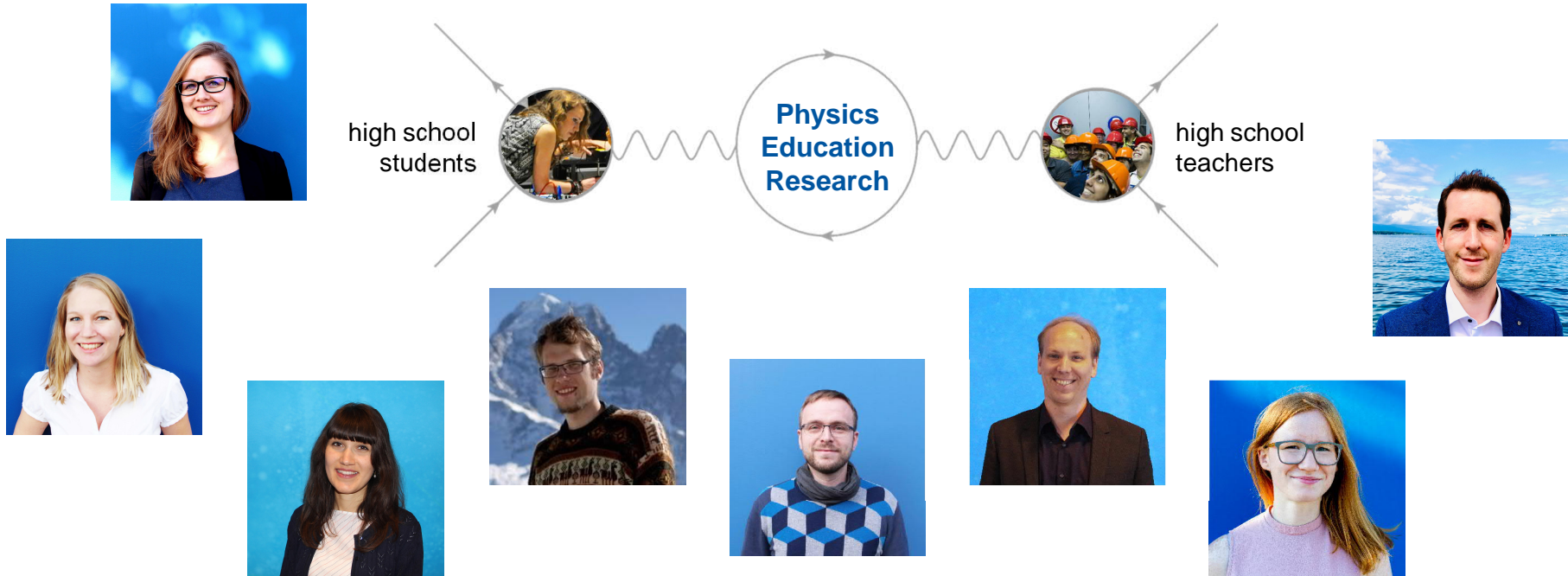
IR-ECO-TSP | S'Cool LAB

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# PER projects – ongoing



# Evaluation of CERN's Teacher Programmes

*Anja Kranjc Horvat*



## Overall aim

Evaluation of CERN's Teacher Programmes and overview of concepts in the field "*CERN and particle physics*" that are relevant for high-school education to ...

- inform and improve CERN's Teacher Programmes
- create a valuable teaching resource

# Evaluation of CERN's Teacher Programmes

*Anja Kranjc Horvat*



## Important steps

- Defining the goals for CERN's Teacher Programmes
- Expert concept map about CERN and particle physics
- Overview of particle physics topics in various national high-school curricula
- Main study: Evaluation of CERN's Teacher Programmes



# Interesting contents and contexts in physics education

*Sarah Zöchling*

## Overall aim

Study high-school students' interest in particle physics contents and contexts and categorise them into different interest types according to their physics-related self-concept to ...

- give recommendations for interesting learning material
- introduce self-concept as a gender-neutral clustering variable in PER

high school students



# Interesting contents and contexts in physics education

*Sarah Zöchling*

## Important steps

- Development and piloting of questionnaire about interest in particle physics contents and context
- Main study about students' interest in particle physics
- Definition of students' interest types
- Study about interesting contexts of particle physics
- Recommendations for interesting learning material

high school students



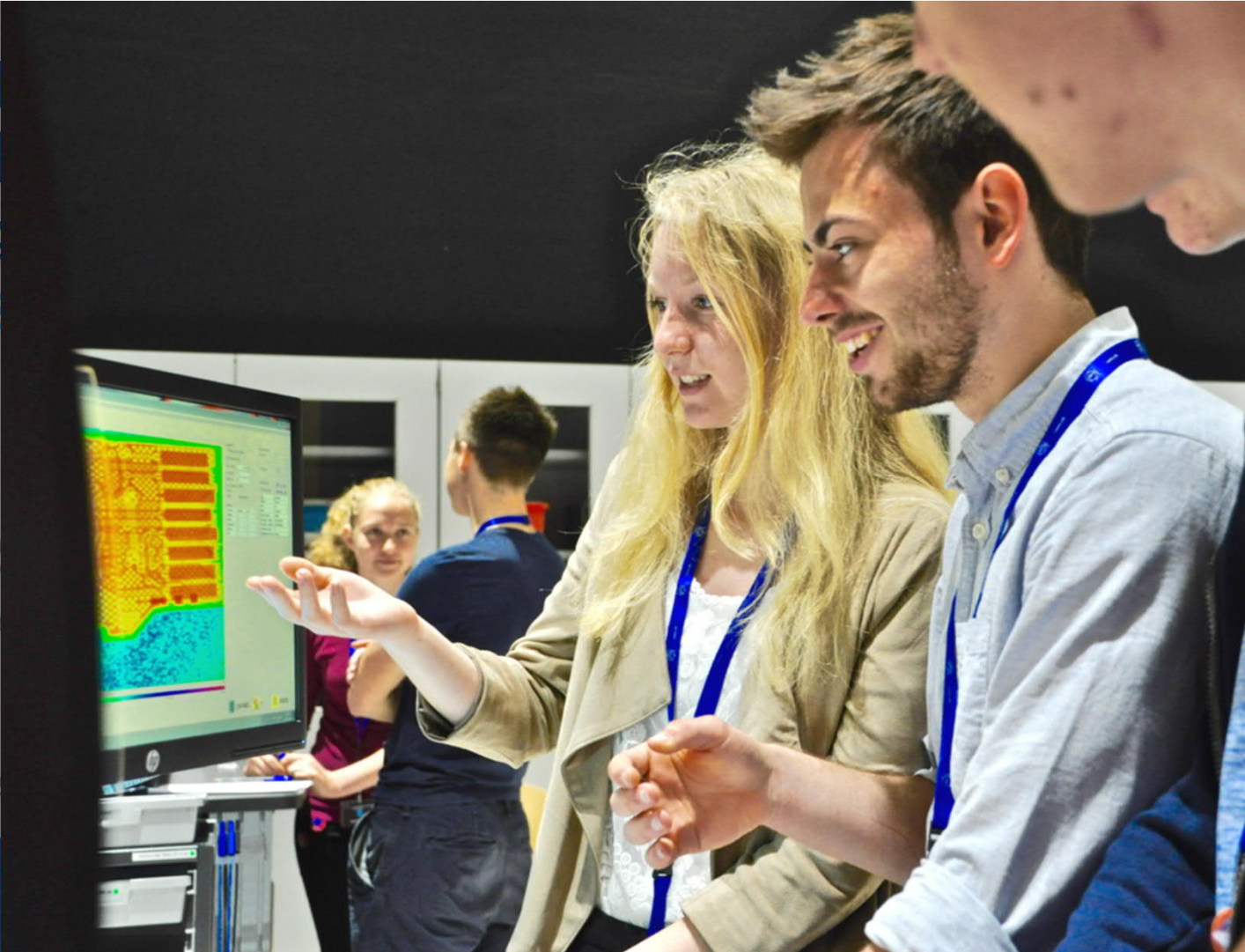


# Interesting physics ed

*Sarah Zöchling*

## Important s

- Developm  
interest in
- Main study
- Definition
- Study abo
- Recomme



# Eye Tracking in PER

*Merten Dahlkemper*

## Overall aim

Introduce eye tracking as a PER method at CERN to ...

- measure students' visual attention objectively
- better understand how students perceive visualisations in particle physics (e.g. Feynman diagrams or event displays)
- develop learning material for particle physics

high school  
students



# Eye Tracking in PER

*Merten Dahlkemper*

## Functional principle

- IR radiation reflected by the pupil
- Calculation of a person's gaze direction
- Production of output image (e.g. heat map or gaze plot)

high school  
students

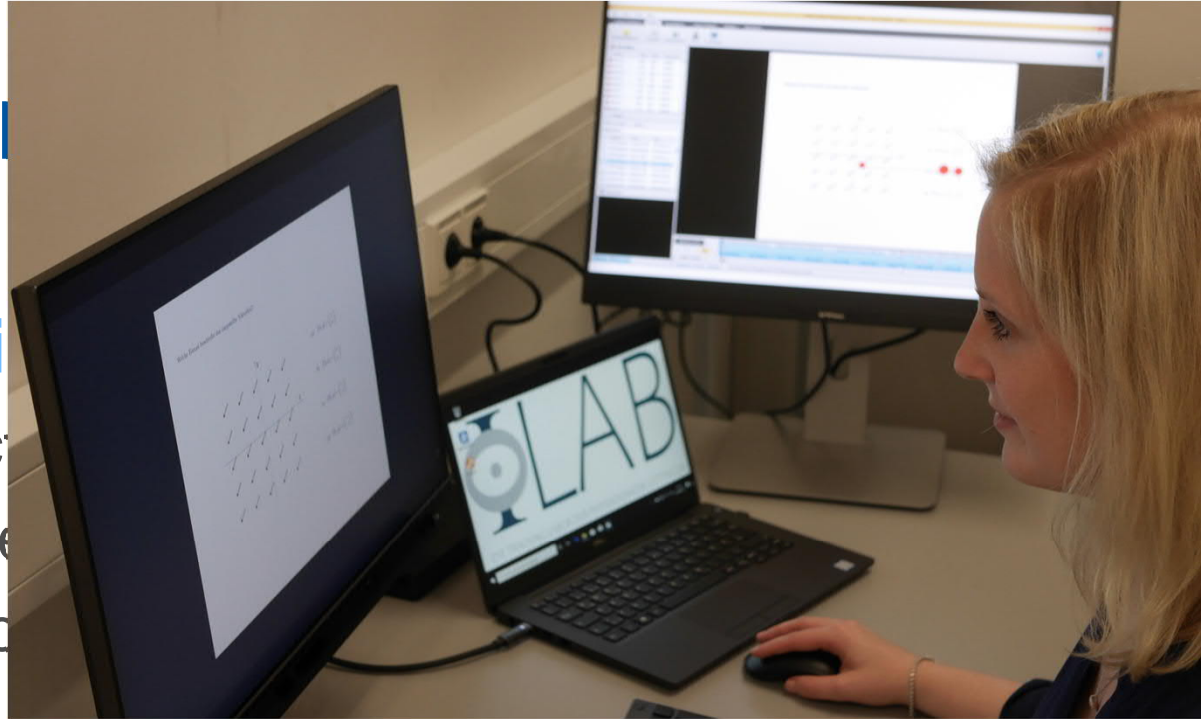


# Eye Tracking in I

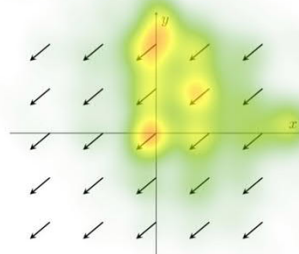
Merten Dahlkemper

## Functional principle

- IR radiation reflects
- Calculation of a pe
- Production of outp



Welche Formel beschreibt das dargestellte Vektorfeld?



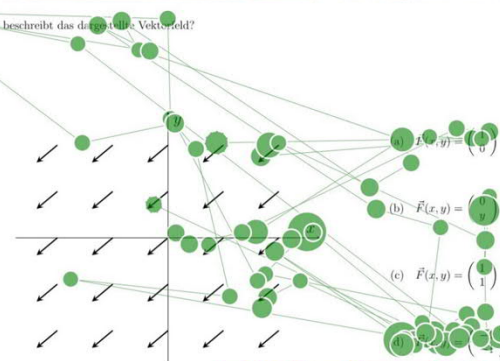
(a)  $\vec{F}(x, y) = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

(b)  $\vec{F}(x, y) = \begin{pmatrix} 0 \\ y \end{pmatrix}$

(c)  $\vec{F}(x, y) = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

(d)  $\vec{F}(x, y) = \begin{pmatrix} -1 \\ -1 \end{pmatrix}$

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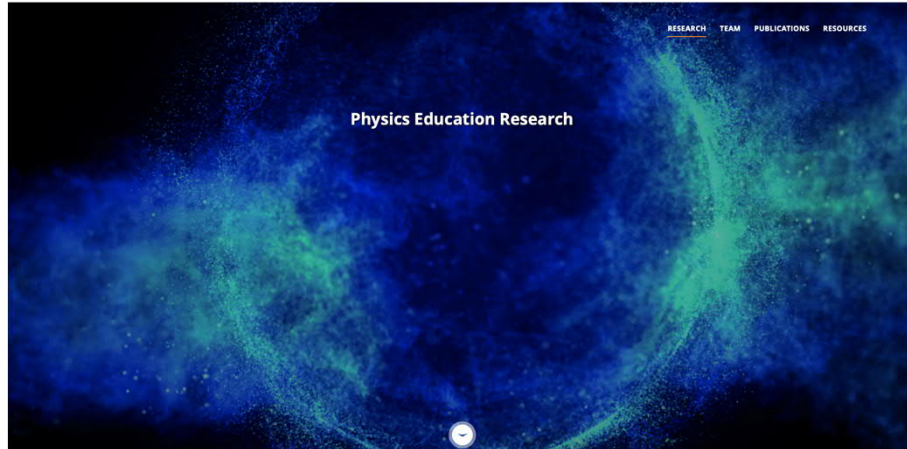
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# Our new PER website

[cern.ch/per](https://cern.ch/per)



- Classroom activities
- Learning units
- Reading material
- Publications



# Thank you very much for your attention!

Merci beaucoup! Dankeschön!

