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Making particle physics and cosmology accessible for high school students

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One often needs to decide how far to introduce students to topics from the abstract scientific and mathematical perspective. It goes hand in hand with Stoffdidaktik (Dilling et al., 2020).
Referring to this question we developed and tested educational materials on Particle Physics and Cosmology for students of grade 9 to 12 at secondary and upper secondary level, and for gifted students in special courses academies as Deutsche Schülerakademie or competitions like Jugend forscht, taking their prior knowledge into consideration. Our material contains, among other things, experiments supported by DESY and the University of Wuppertal. The theoretical parts of our course material include Maxwell's equations and the Klein-Gordon equation (according to Ellwanger, 2012), which require basic knowledge in differential equations and group theory (according to Wong, 2013).
To evaluate the results and the material and the courses from a cognitive as well as a psychological point of view, we used students'notebooks, their learning diaries, questionnaires, and interviews collected over a school year (Stoppel, 2019).
The Poster Presentation will take a look at the scientific content, emphasizing educational and psychological aspects.

Dilling, F., Stricker, I., Tran, N. C., & Vu, D. P. (2020). Development of Knowledge in Mathematics and Physics Education. In S. F. Kraus & E. Krause (Eds.), MINTUS. (pp. 299–344). Wiesbaden: Springer.
Ellwanger, U. (2012). From the universe to the elementary particles. Berlin: Springer.
Stoppel, H.-J. (2019). Beliefs und selbstreguliertes Lernen. Wiesbaden: Springer.
Wong, C. W. (2013). Introduction to Mathematical Physics (2. ed.). Oxford: Oxford Univ. Press.

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Collaboration

other Collaboration

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Presenter: STOPPEL, Hannes

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