

Caution

The following data have been gathered with great care.

But:

- The curricula are changing quickly and at the moment undergoing substantial change, also in underlying philosophy
- Teachers tend to act according their habitude, such that the reality might look quite different at some schools
- Local possibilities might strongly affect the teaching of astrophysics and HEP



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Faculty of science, department of physics, Chair of didactics of physics

Astronomy at German schools



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Astronomy



No
astronomy



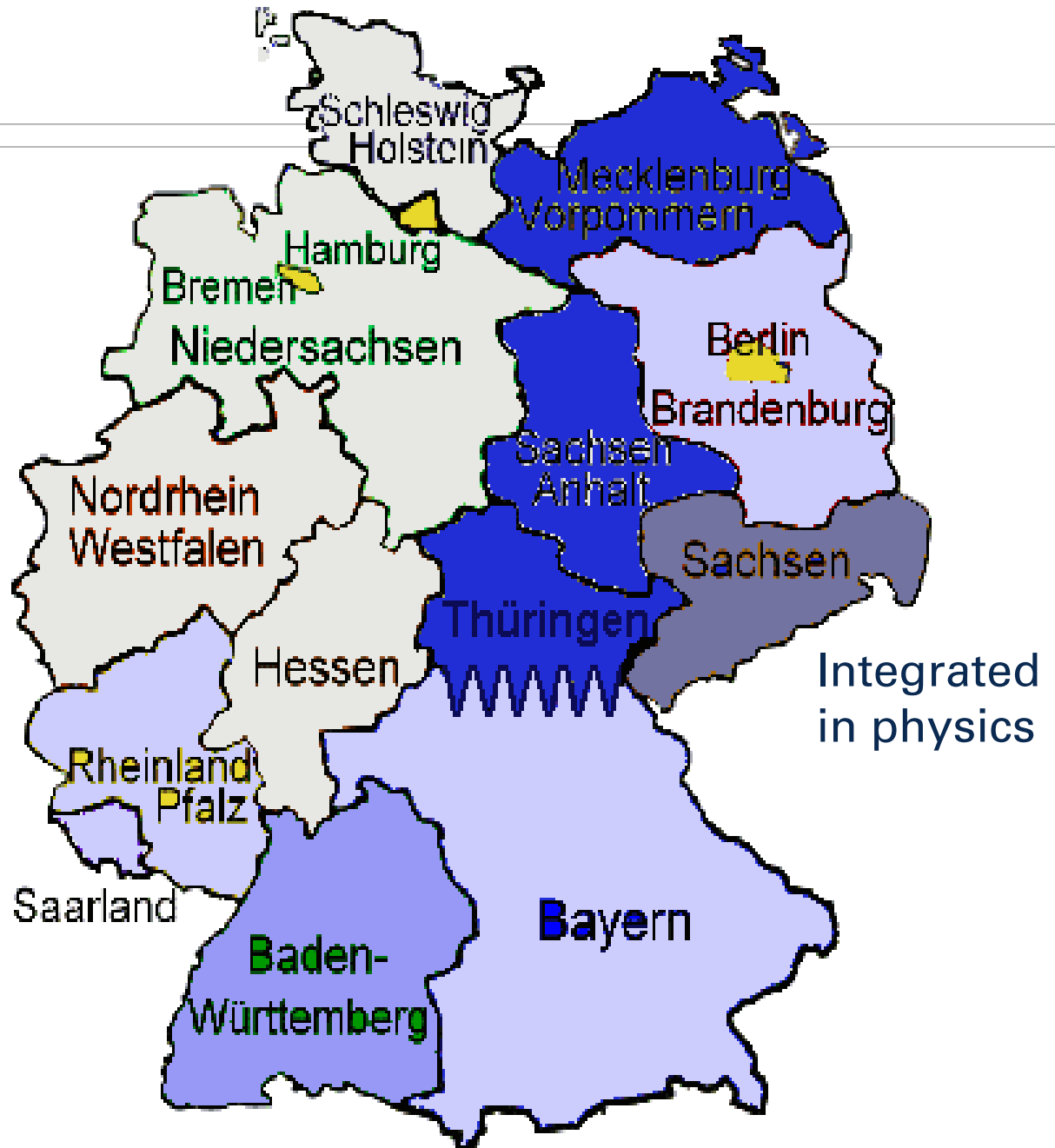
Teacher
can
choose



Student
can
choose



obligatory



Astronomy as explicit subject

- No astronomy in
 - Bremen, Hamburg, Hessen, Niedersachsen, Nordrhein-Westfalen, Schleswig-Holstein
- Astronomical aspects possible in
 - **Rheinland-Pfalz:**
in grade 11/12 optional subjects possible: Astronomy (10h), astrophysics (10h), Cosmology (10h)

Astronomy as voluntary subject

- Astronomy as own subject on voluntary basis and according to school offers
 - **Baden-Württemberg, Bayern, Sachsen, Sachsen-Anhalt:**
in grade 11/12 students can choose course „Astronomy“
2h/week, one year or two years
 - **Berlin, Brandenburg:**
In grades 9/10 astronomy might be possible according to offers of school and choice of students
- Astronomy and Astrophysics
 - **Bayern, Hessen**
Grade 12: The teacher can decide to teach „Astrophysics“ instead (Bayern) of „normal“ physics or as (small) supplementary area (Hessen)

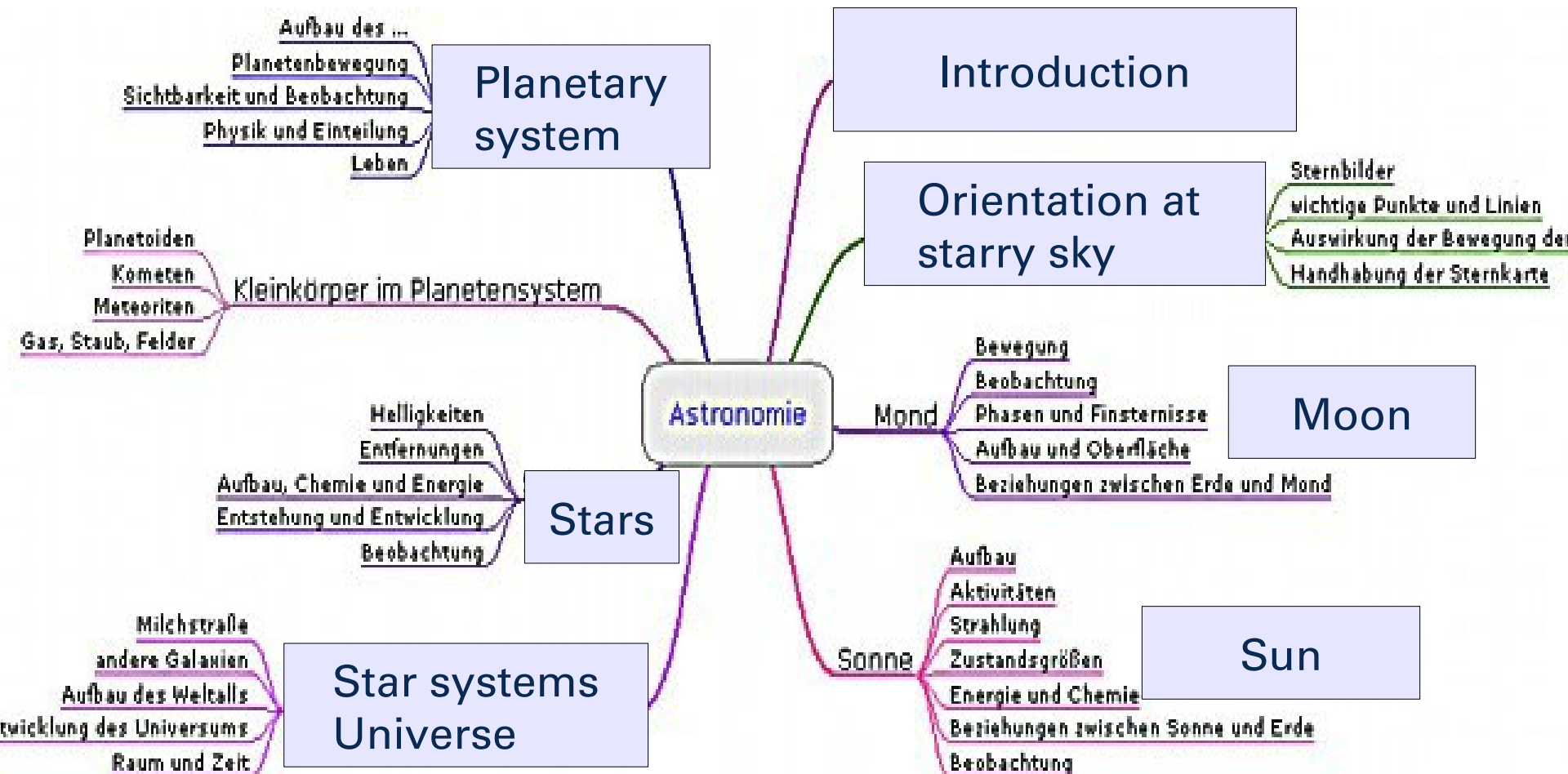
Astronomy/Astrophysics as obligatory subject

- Astronomy as own subject:
 - **Mecklenburg-Vorpommern**
Grade 9: 1h/week
 - **Sachsen-Anhalt, Thüringen:**
Grade 10: 1h/week
 - **(Sachsen:)**
Grade 10: about 1h/week included in physics lessons (strongly depending on teacher)
 - **((Bayern))**
Grade 10: physics contains „Astronomical World view“ (8h)

Astronomical/Astrophysical elements in general physics education

- Mostly solar and moon eclipse in lower grades (light ray model)
- Planetary motion in grades 10/11 (in context of mechanics and circular motion)
- Solar spectra in grades 11/12 (in context of atomic model, line spectra)

Typical contents of a complete course



Details „Astrophysics“ in Bavaria

- Orientation in the sky (6h)
- Solar system (9h)
- The sun (17h)
- Stars: physics, development (18h)
- Great structures in the universe (13h)





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Elementary Particle Physics at German schools



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Elementary particles



Elementary Particle Physics in the Physics Curricula

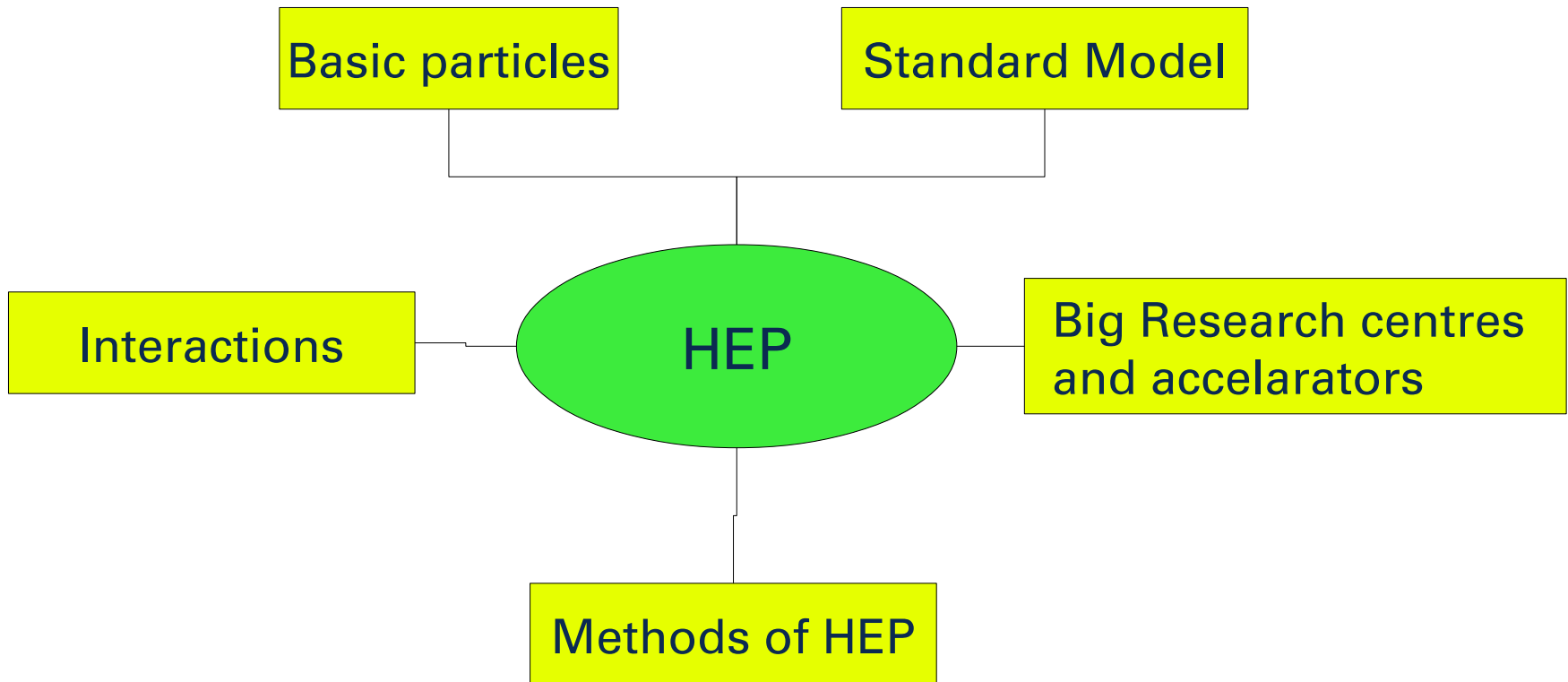
EPP/HEP is – if at all - always integrated in the physics curriculum

- No EPP mentioned in
 - Brandenburg, Hamburg, Mecklenburg-Vorpommern, Niedersachsen, Nordrhein-Westfalen, (Saarland)
- Voluntary treatment in
 - **Berlin, Hessen, Rheinland-Pfalz, Saarland, Schleswig-Holstein**
Sometimes no hours are given, in other cases amount varies between 8h and 43h

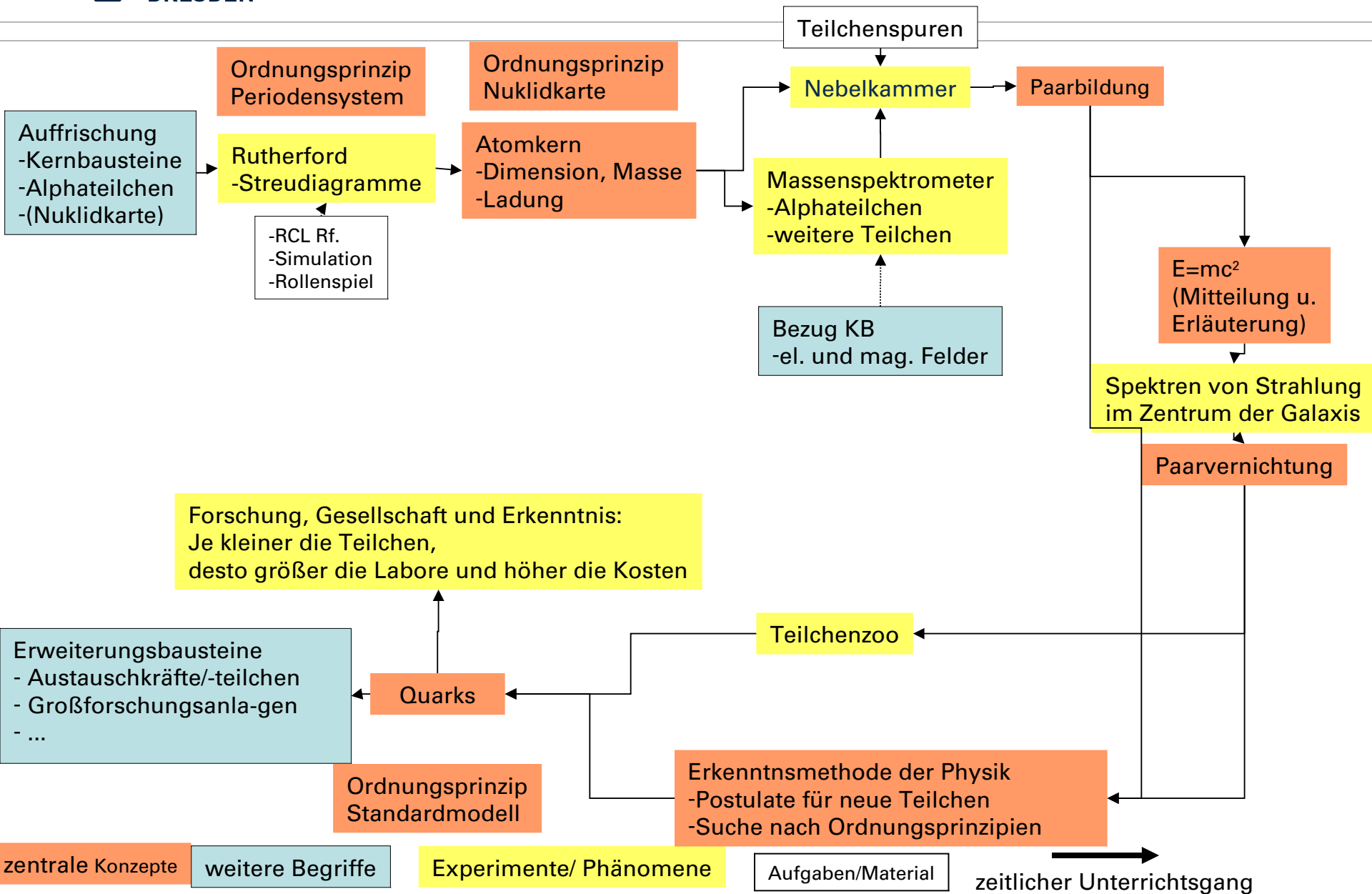
EPP as obligatory subject

- Obligatory treatment in very different amount is foreseen in:
 - **Baden-Württemberg, Bayern, Bremen, Sachsen, Sachsen-Anhalt, Thüringen**
Amount varies from 1h to 6h; some curricula do not give any numbers of lessons

Typical contents of a course

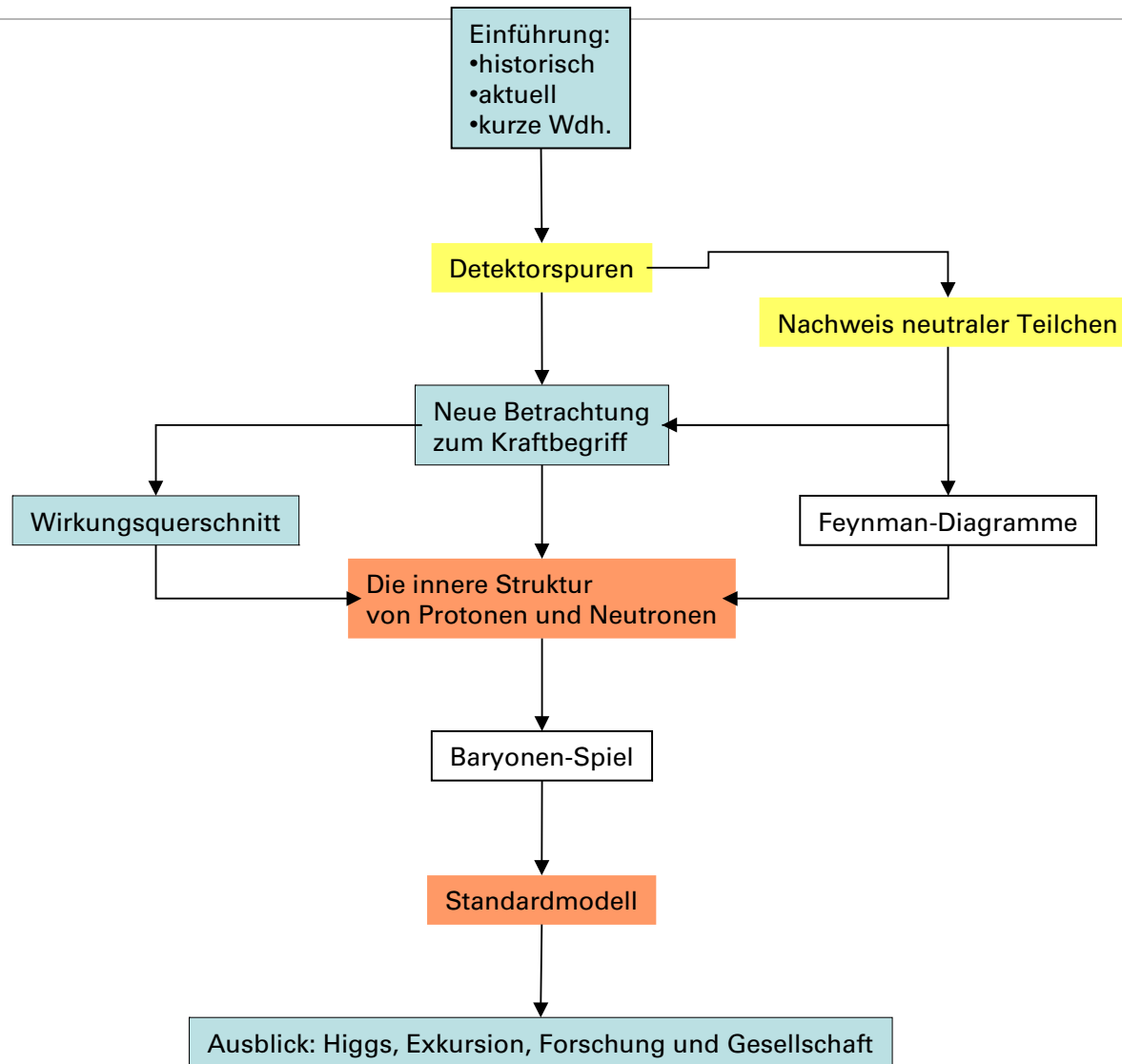


Struktur des KB „Struktur der Materie“





„Die Struktur der Materie“- Berliner Vorschlag




zentrale Konzepte

weitere Begriffe

Experimente/ Phänomene

Aufgaben/Material

zeitlicher Unterrichtsgang 

Interdisciplinary courses in Grades 11/12

For Astronomy, Astrophysics and EPP/HEP there are projects possible.

- Students work on subject according to own choice, write „term paper“
 - **Baden-Württemberg, Saarland:**
Interdisciplinary „seminar course“ possible (2h/week , one year)
 - **Bayern:**
W-Seminar (science-oriented) and P-Seminar (oriented towards later choice of study or profession) (3h/week, 1 1/2 years)



»Wissen schafft Brücken.«