

Experimental Physics 3 - Em-Waves, Optics, Quantum mechanics

Lecture 22

Some dates in January and February

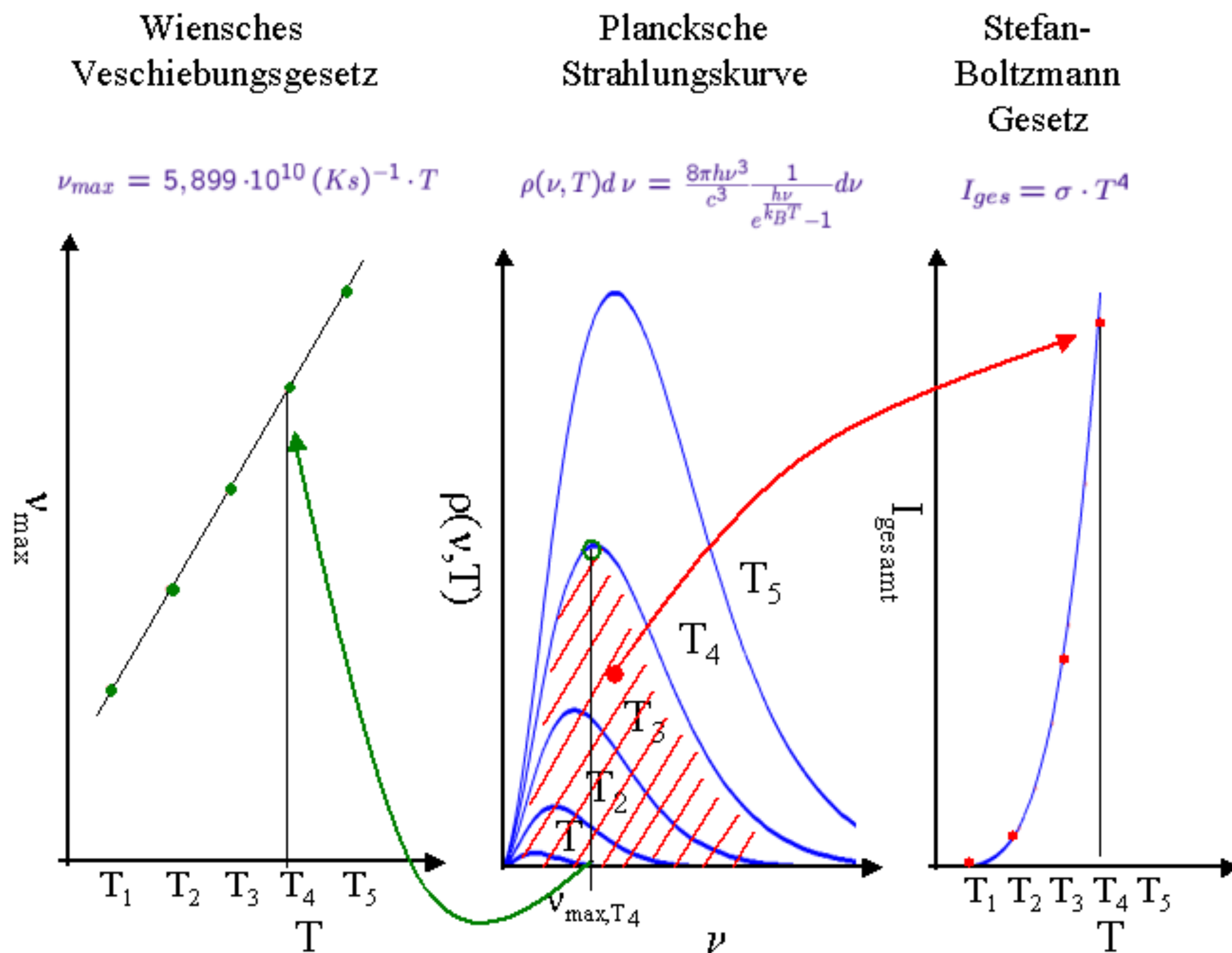
Mo	Tu	We	Th	Fr	Sa	Su
						1
2	3	4	5	6	7	8
9	10	11	12 Submission sheet 11	13	14	15
16	17	18	19 Submission mock exam	20	21	22
23	24	25	26 Submission sheet 12	27	28	29
30	31 Last Tuesday seminar	1	2 Last Thursday seminar Last lecture	3		

Exam: February 20, 2023, 9 am - 12 pm

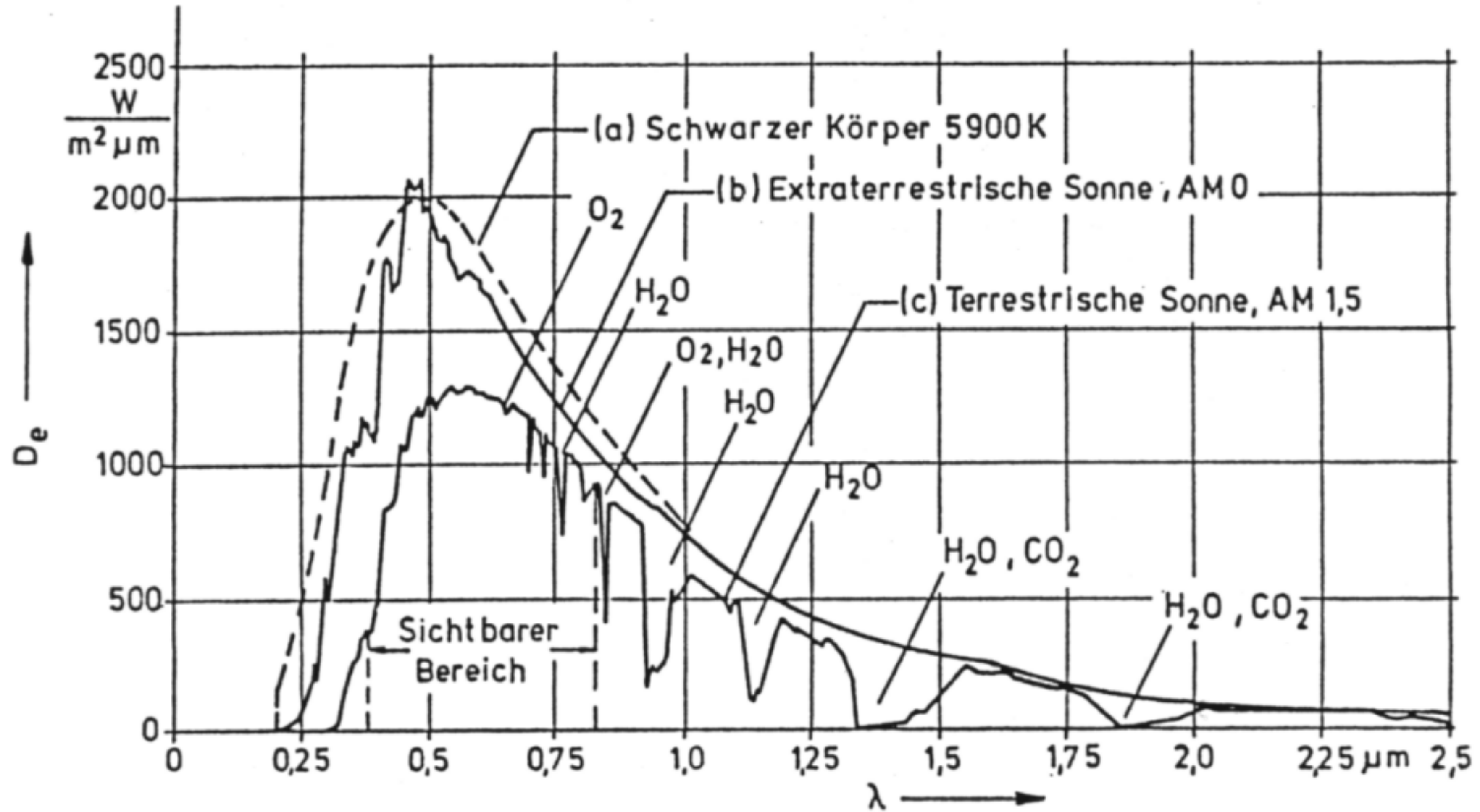
Re-exam: March 27, 2023, 9 am - 12 pm

The Birth of Quantum Mechanics

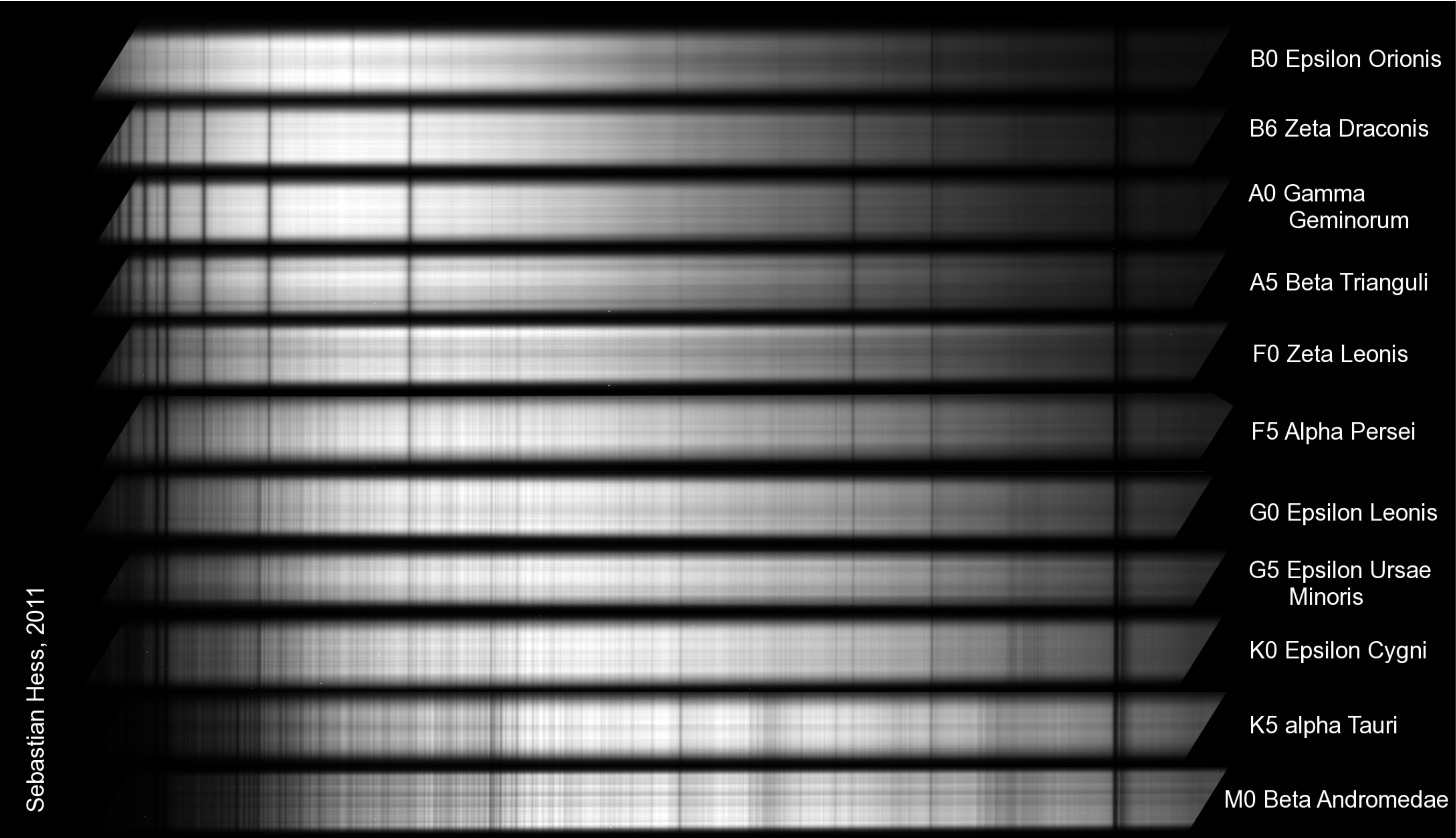
Planck's law of radiation



Electromagnetic spectrum of the sun



Electromagnetic spectrum of stars

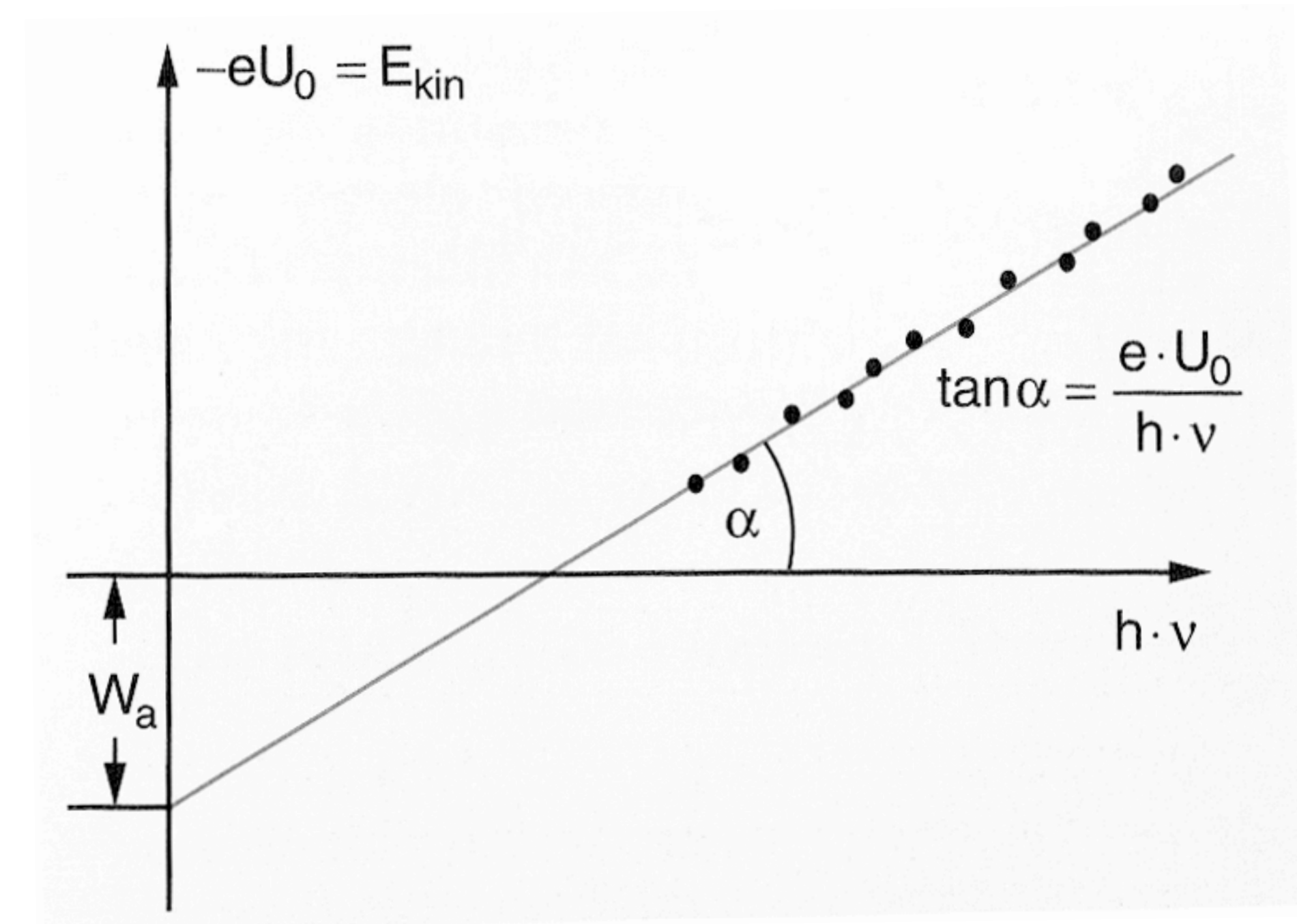
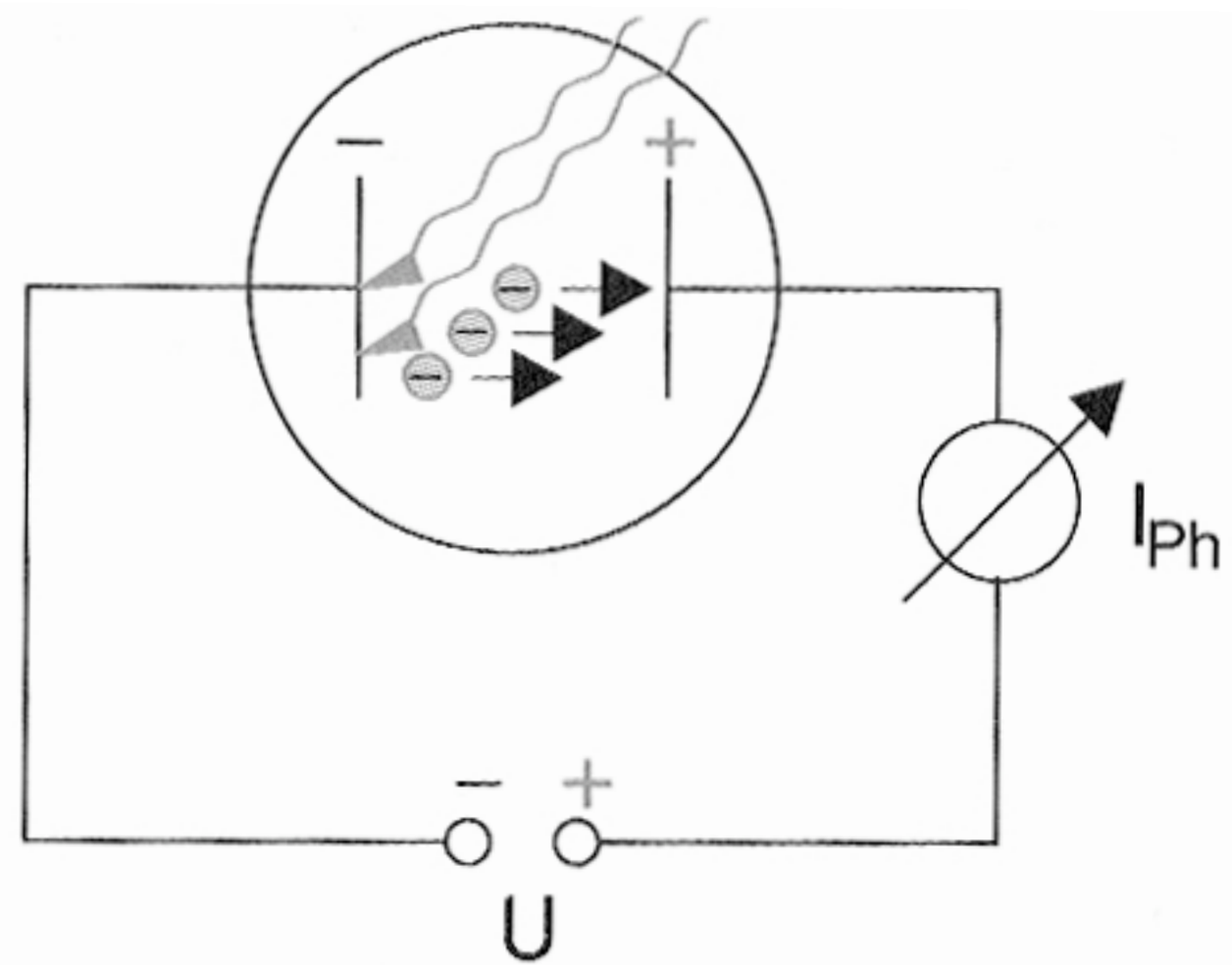


The Particle Nature of light

The historic photo effect

Lennard 1902

- Kinetic energy of the photo electrons depends only on the wavelength of light
- Number of photo electrons only depends on the intensity
- Electrons are emitted without retardation



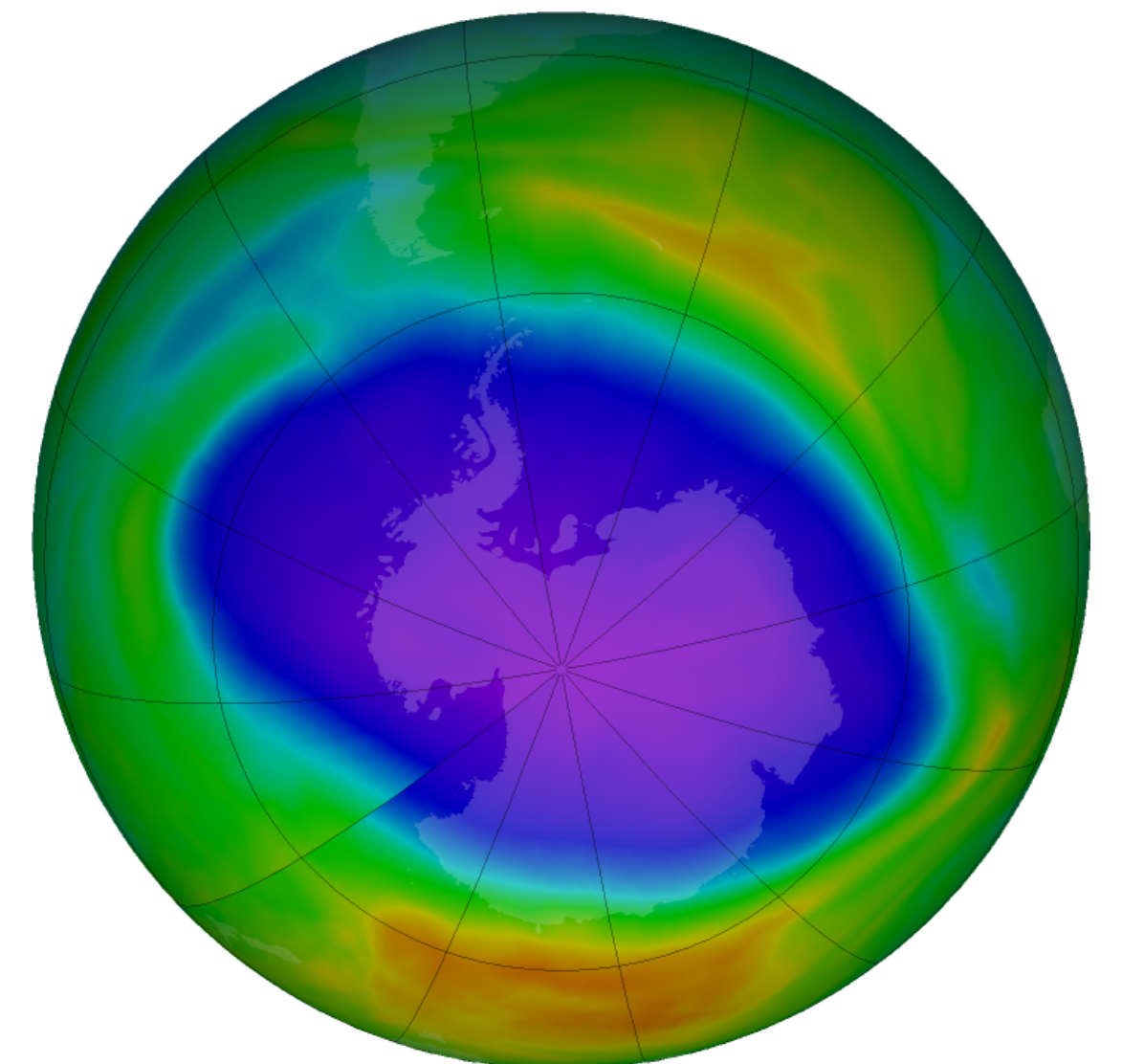
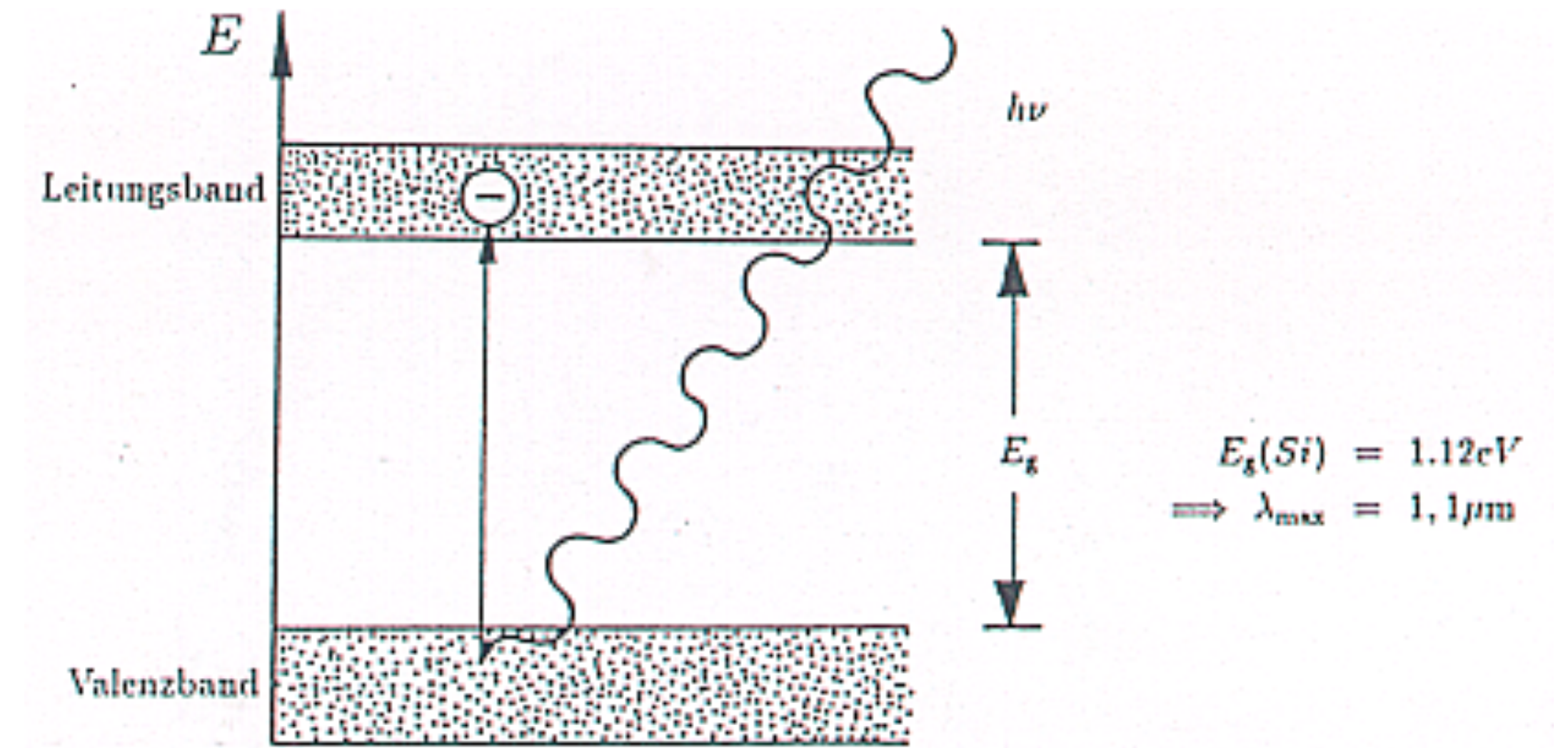
The photoelectric Effect

Work Function Values

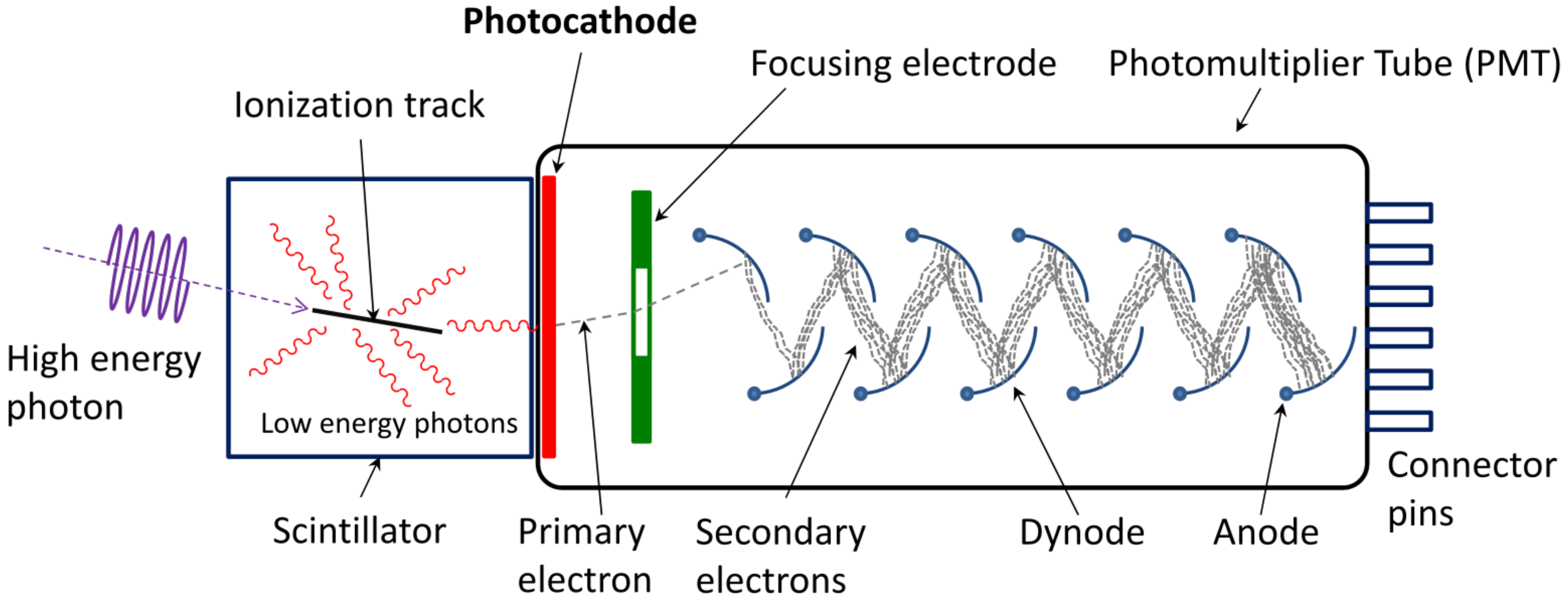
Metal	Work Function (eV)	Metal	Work Function (ev)
Na	2.46	Pt	6.35
Al	4.08	Pb	4.14
Cu	4.70	Fe	4.50
Zn	4.31	Cs	1.90
Ag	4.73	K	2.24
W	4.58	Mo	4.2

The photoelectric effects

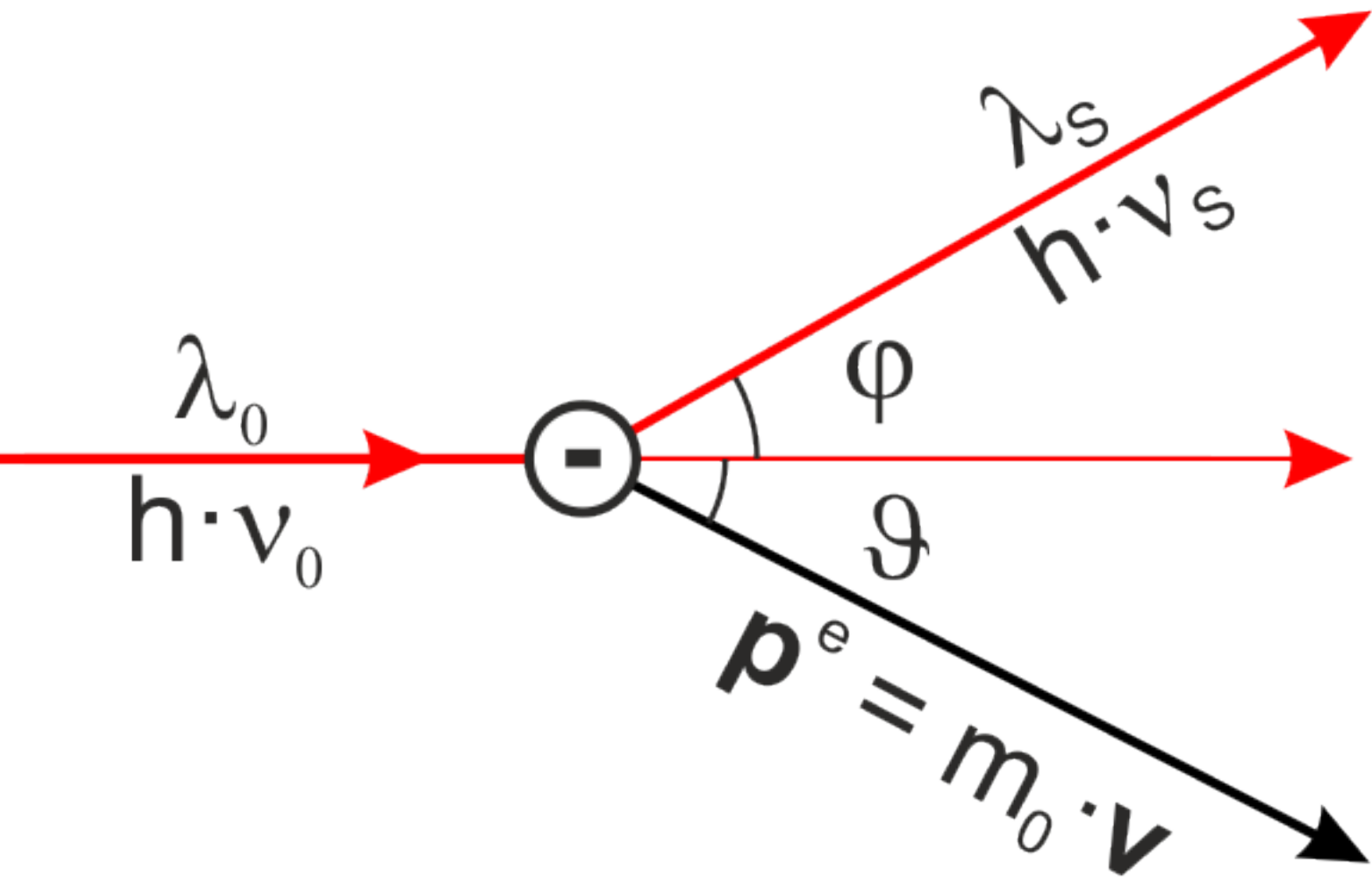
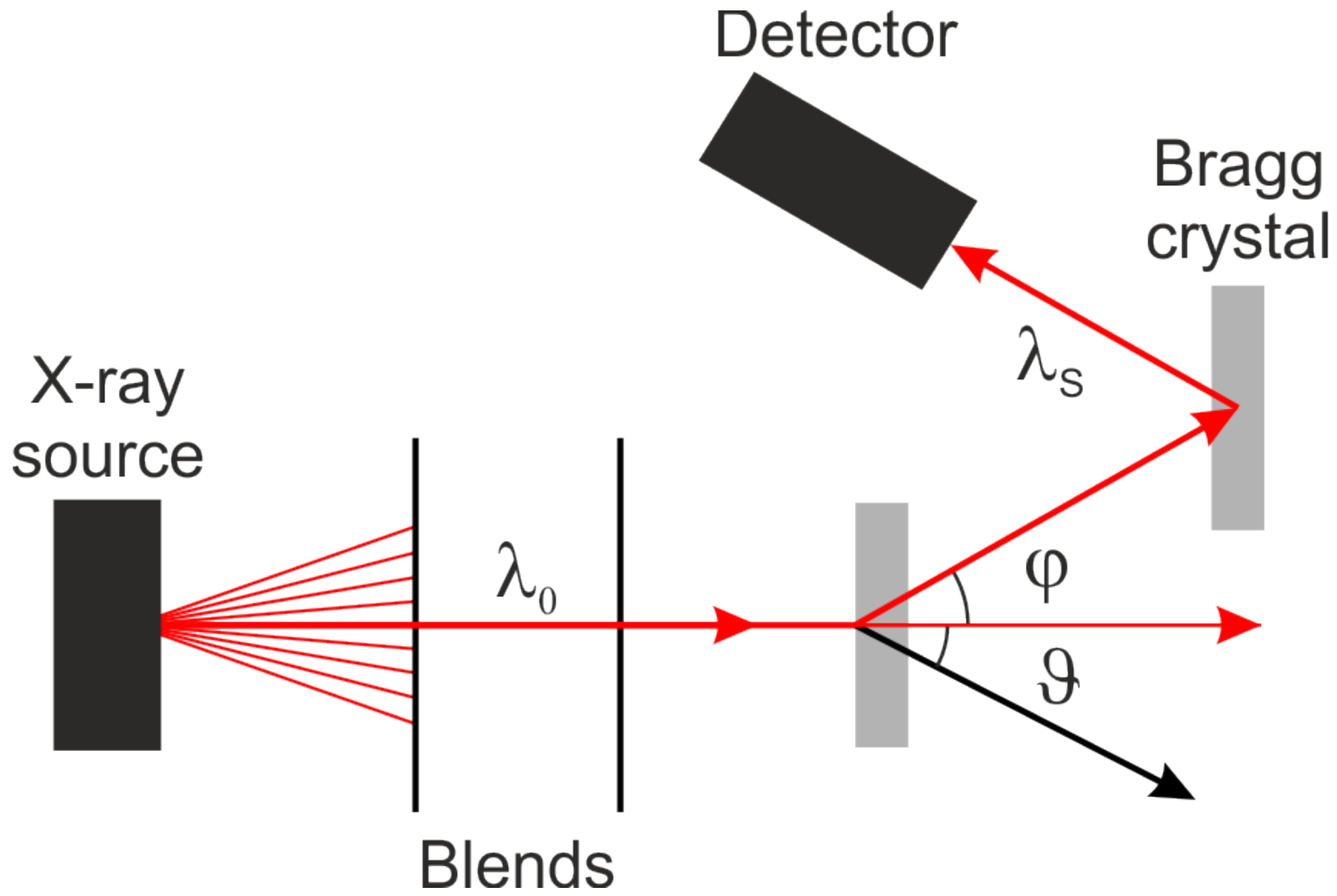
- (1) External photoelectric effect
(photoemission, Hallwachs effect)
 - Emission of an electron
- (2) Internal photoelectric effect
 - Creating free electrons and increase conductivity
 - Photoconductivity and Photovoltaic effect
- (3) Photoionization
 - Ionization of single atoms or molecules



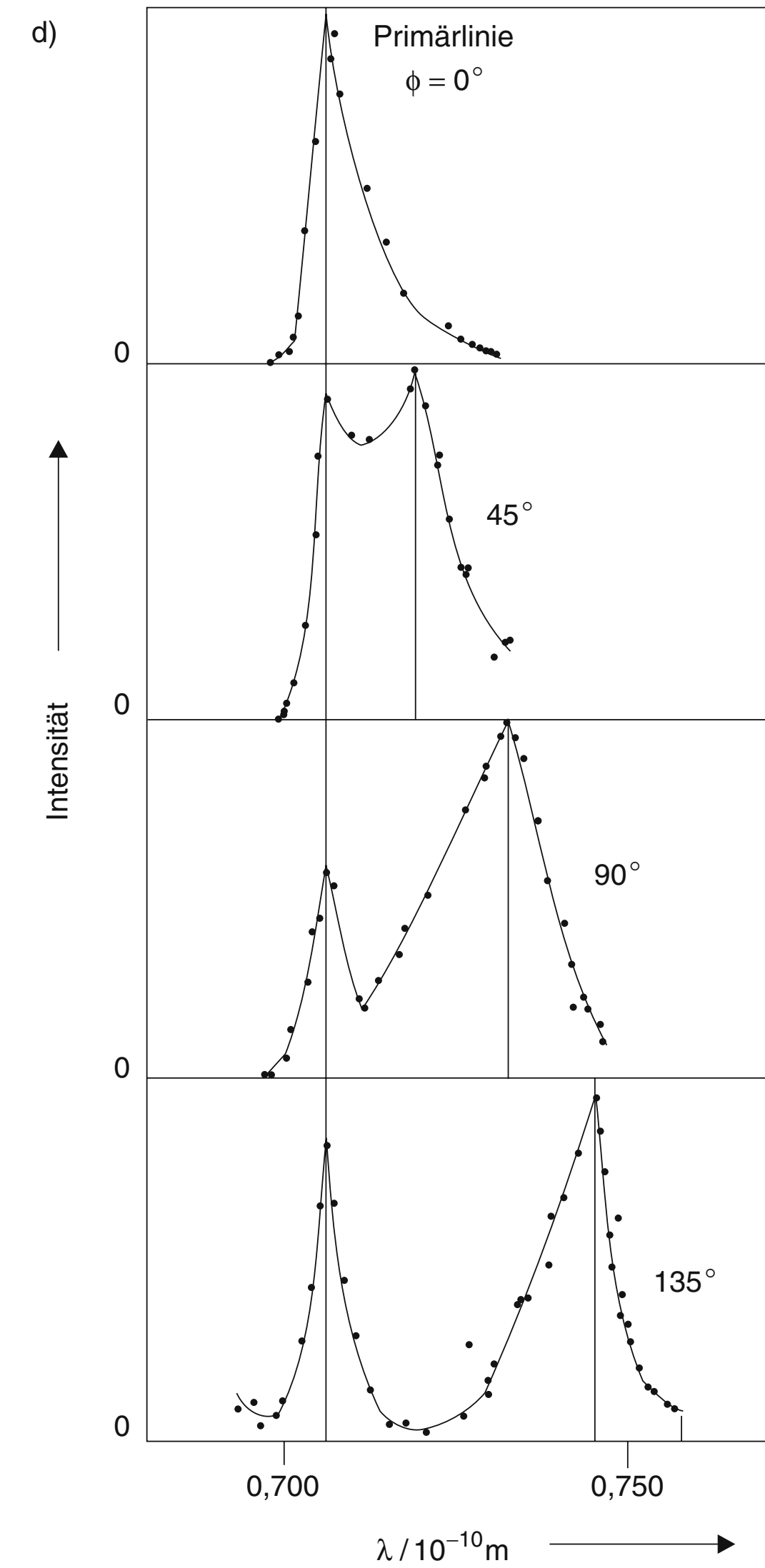
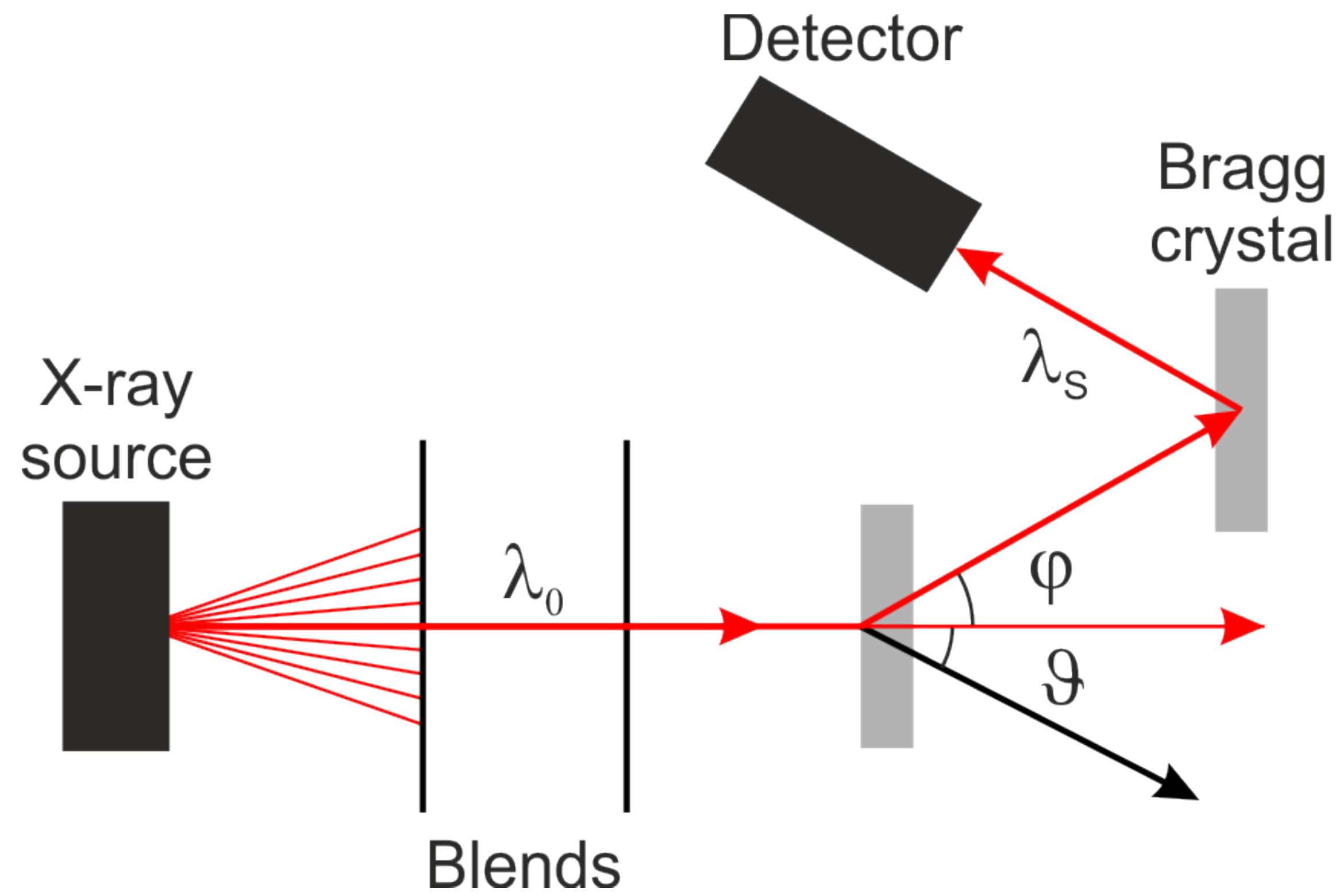
Detection of gamma rays - Scintillator



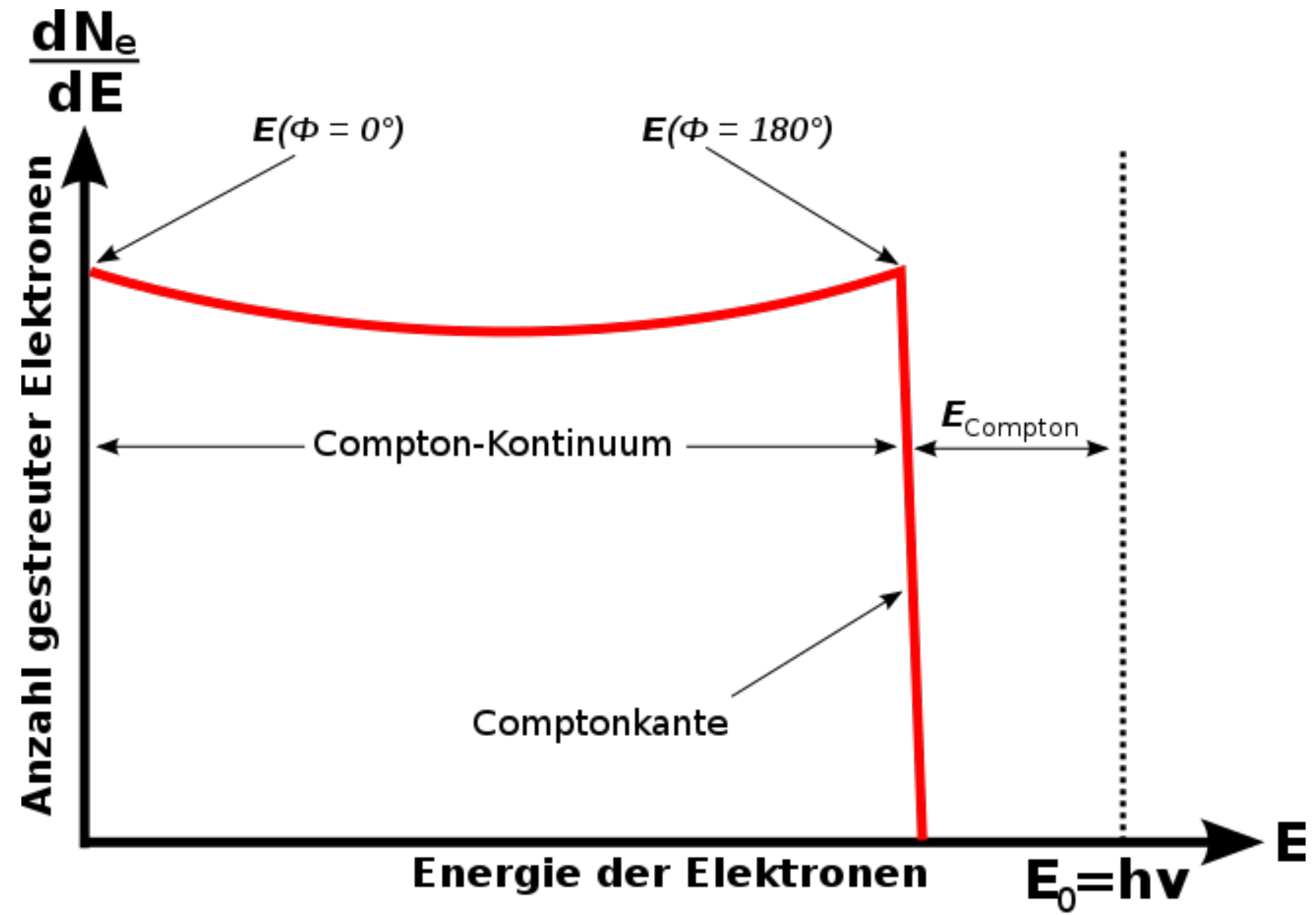
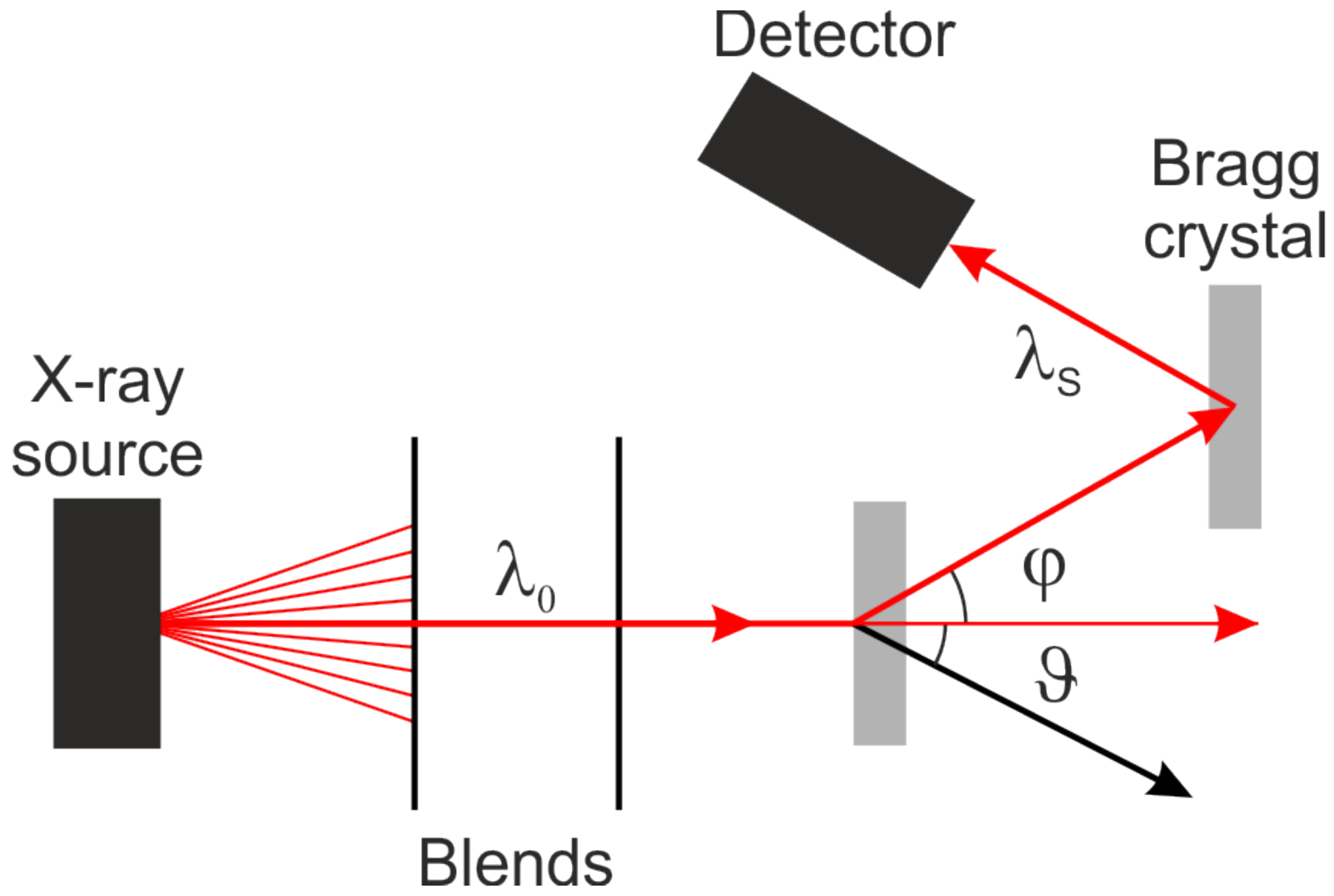
The Compton effect



The Compton effect



The Compton effect



Elektronenenergie

