Messungen der Lichtgeschwindigkeit

$c = \infty$? (das galt als "natürlich")

ca. 1607, Galilei: Laterne abdecken

Antwort von Nachbarhügel

⇒ unmessbar schnell

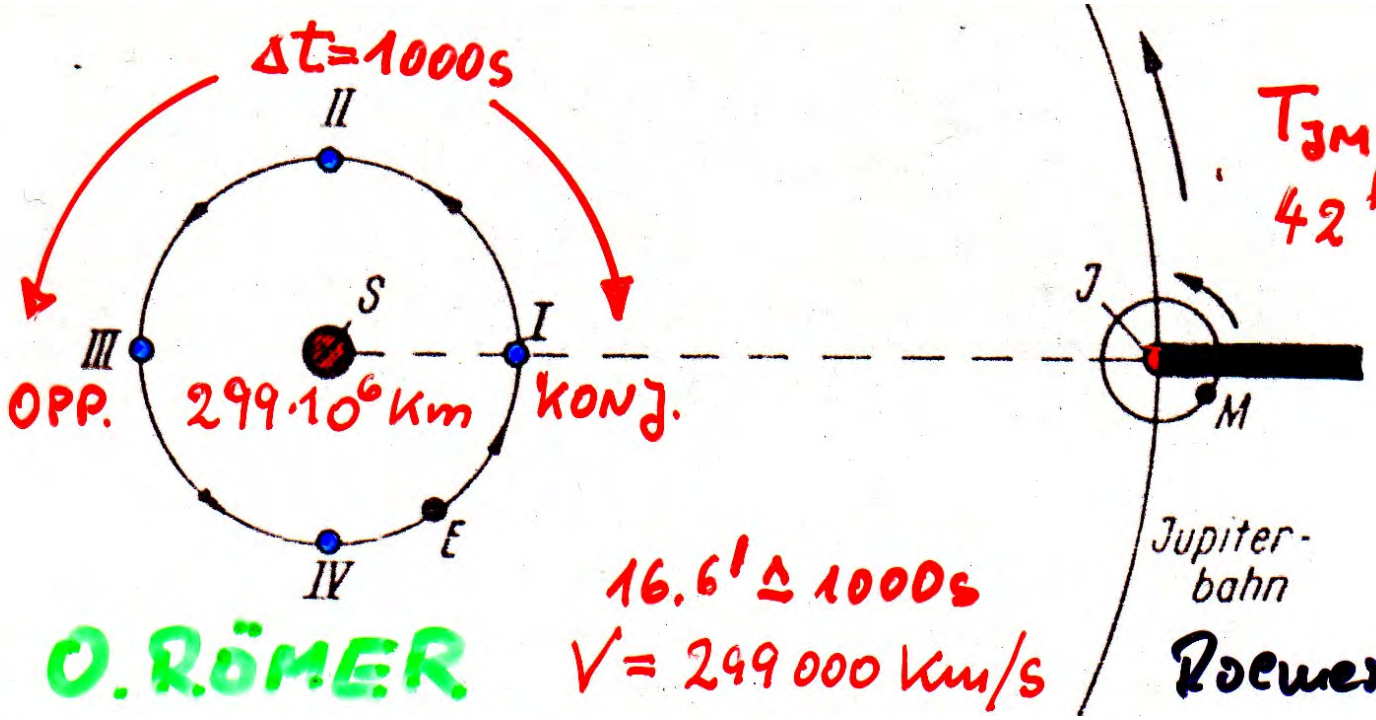
1676, Römer: Umlauf von Io um Jupiter

Verfinsterungen im Jupiterschatten

Differenz zu Uhr abh. von Distanz

⇒ 214000 km/s

"Jupiter-Monde"



T_{JM} (konj): $42^h 28^m 36^s$

1676 O. RÖMER

16.6' ≙ 1000s

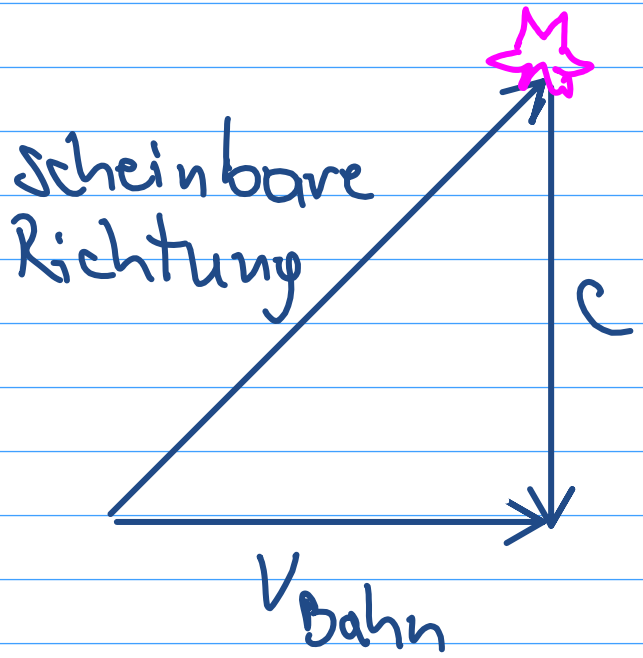
$V = 299\,000$ km/s

Rechne: 22'

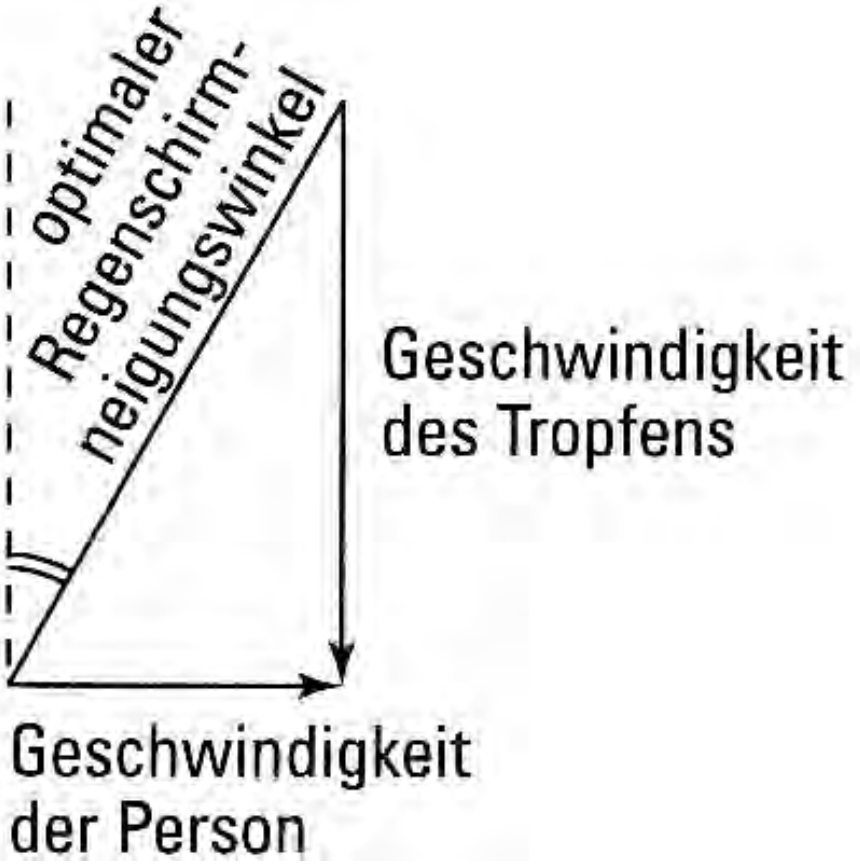
1729, Bradley: Parallaxe der Fixsterne

für Erdbahn 20'' statt 1' gem. Geometrie

Maß für $\frac{v_{Bahn}}{c} \approx \frac{30\ km/s}{300\,000\ km/s}$



Regen-Aberration



aus Bergmann-Schaefer, Bd. II

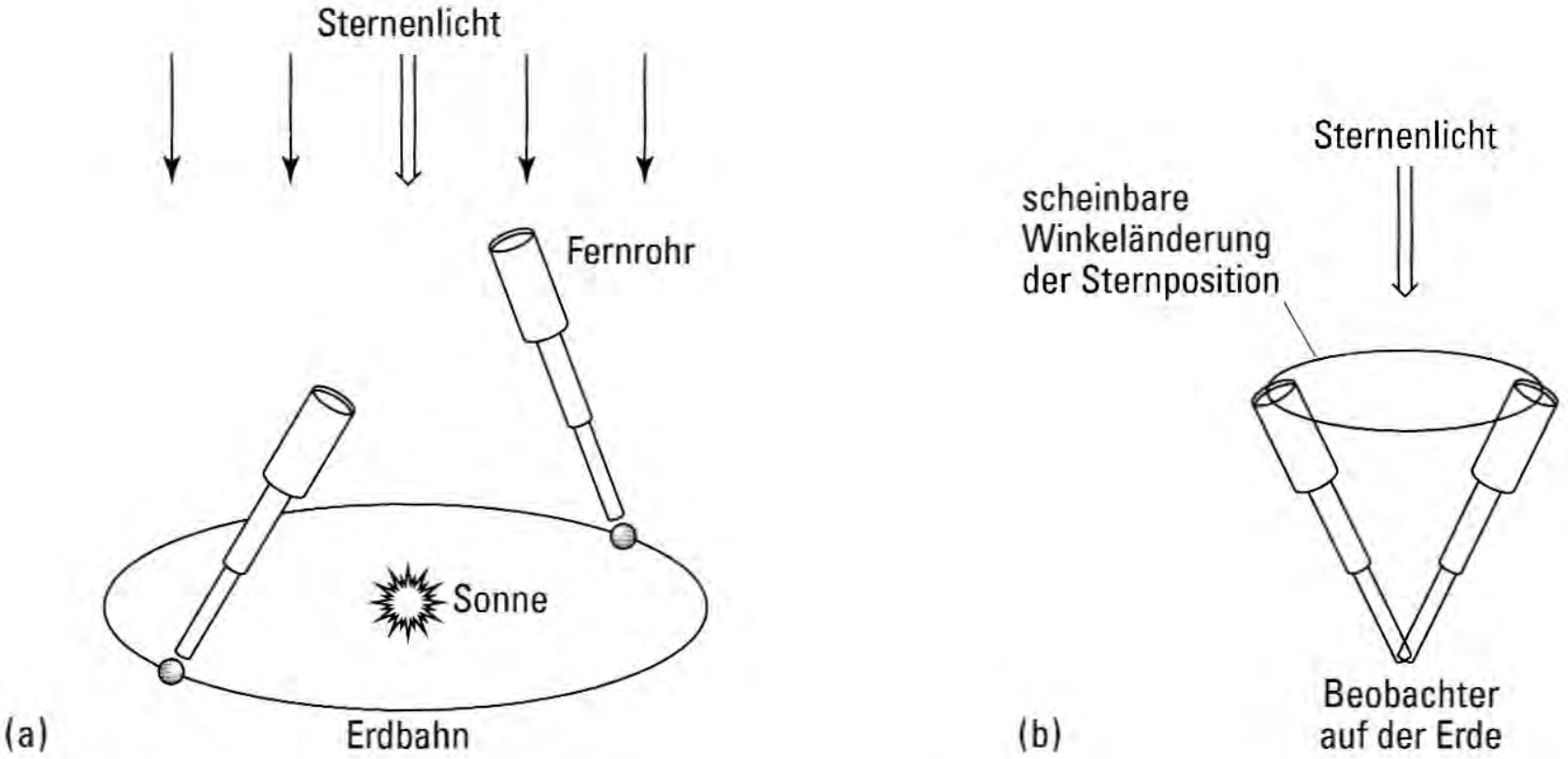
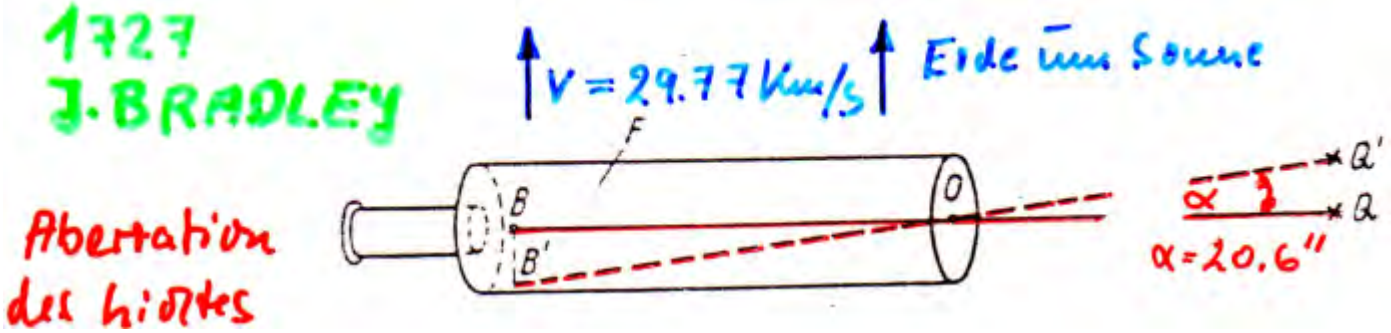
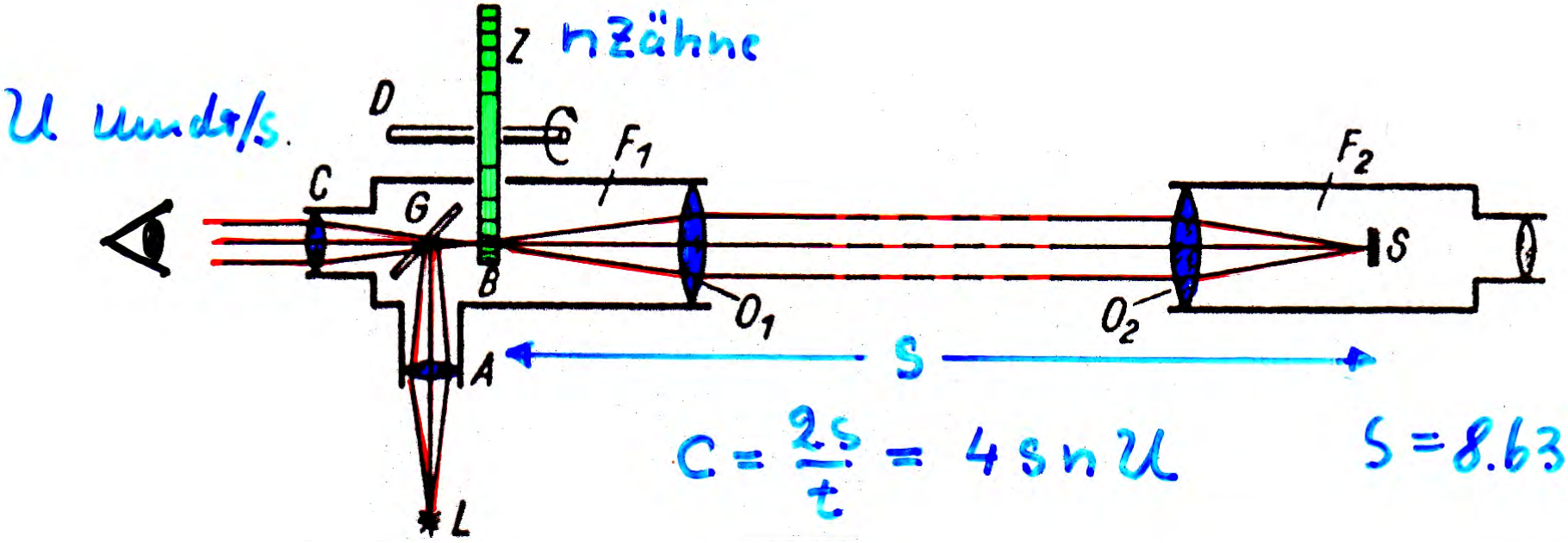


Abb. 6.56 Zur astronomischen Aberration: (a) Beobachtung eines Sterns, der senkrecht auf der Erdbahnebene (Ekliptik) steht; (b) Maximale Positionsveränderung innerhalb eines Jahres.



1849, Fizeau — Zahradmethode

(≙ Galilei mit besserer Lampe und fixerem Assistenten)

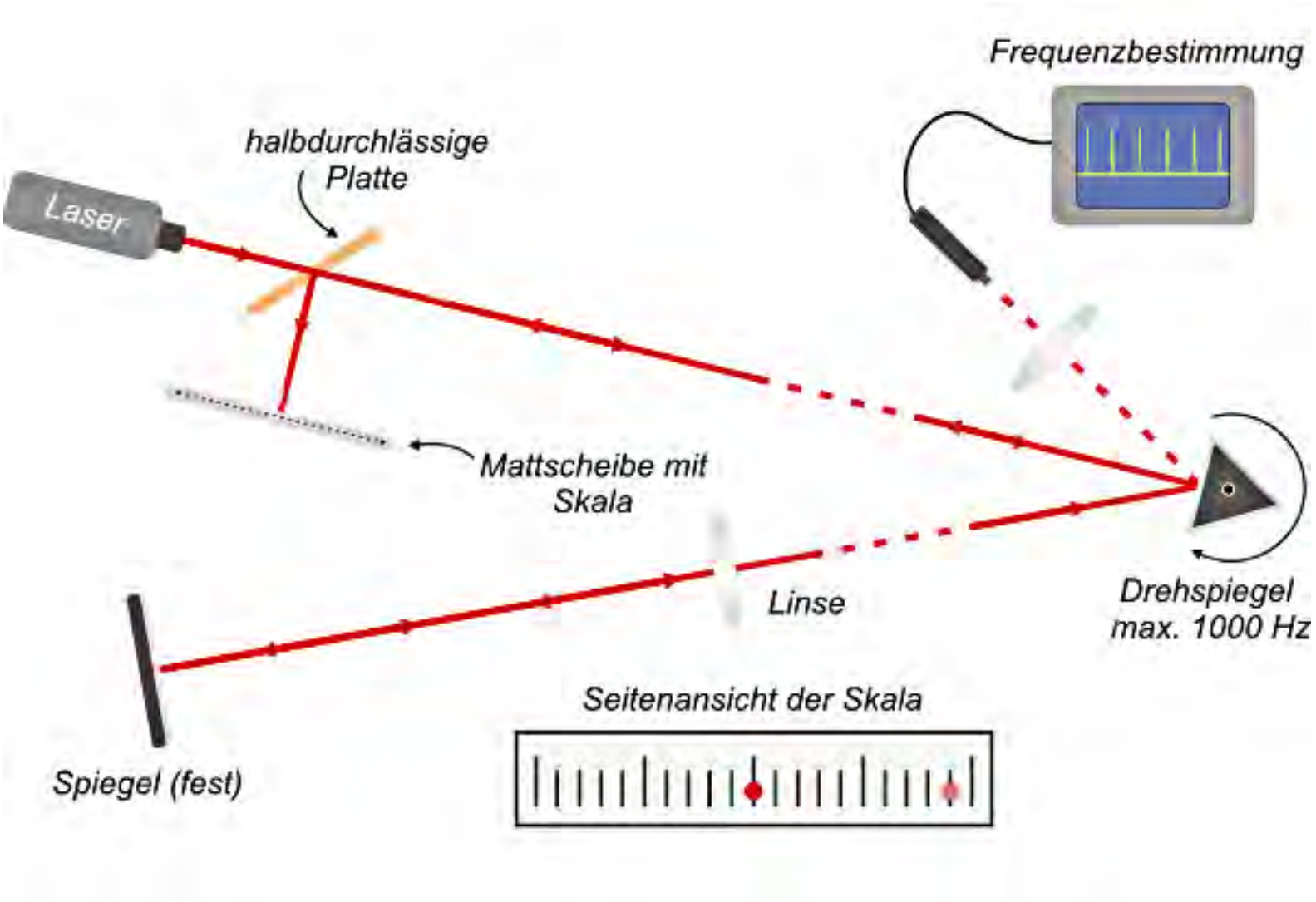


$$c = \frac{2s}{t} = 4snU \qquad s = 8.633\ Km$$

Drehspiegelmethode

1851 Léon Foucault

1838 François Arago Vorschlag der Drehspiegelmethode aber keine Messung



Angepasst nach Bild von Universität Göttingen

The speed of electromagnetic radiation in free space

Date	Experimenter	Country	Method	Speed (km/s)	Uncertainty (km/s)
1600(?)	Galileo	Italy	Lanterns and shutters	"If not instantaneous, it is extraordinarily rapid"	
1675	Roemer	France	Astronomical	200,000	
1729	Bradley	England	Astronomical	304,000	
1849	Fizeau	France	Toothed wheel	313,300	
1862	Foucault	France	Rotating mirror	298,000	500
1876	Cornu	France	Toothed wheel	299,990	200
1880	Michelson	U.S.A.	Rotating mirror	299,910	50
1883	Newcomb	England	Rotating mirror	299,860	30
1883	Michelson	U.S.A.	Rotating mirror	299,853	60
1906	Rosa and Dorsey	U.S.A.	Electromagnetic theory	299,781	10
1923	Mercier	France	Standing waves on wires	299,782	15
1926	Michelson	U.S.A.	Rotating mirror	299,796	4
1928	Karolus and Mittelstaedt	Germany	Kerr cell	299,778	10
1932	Michelson, Pease, and Pearson	U.S.A.	Rotating mirror	299,774	11
1940	Huettel	Germany	Kerr cell	299,768	10
1941	Anderson	U.S.A.	Kerr cell	299,776	14
1950	Bergstrand	Sweden	Geodimeter	299,792.7	0.25
1950	Essen	England	Microwave cavity	299,792.5	3
1950	Bol and Hansen	U.S.A.	Microwave cavity	299,789.3	0.4

1951	Aslakson	U.S.A.	Shoran radar	299,794.2	1.9
1952	Rank, Ruth, and Ven der Sluis	U.S.A.	Molecular spectra	299,776	7
1952	Froome	England	Microwave interferometer	299,792.6	0.7
1954	Florman	U.S.A.	Microwave interferometer	299,795.1	1.9
1957	Bergstrand	Sweden	Geodimeter	299,792.85	0.16
1958	Froome	England	Microwave interferometer	299,792.50	0.10
1965	Kolibayev	U.S.S.R.	Geodimeter	299,792.6	0.06
1967	Grosse	West Germany	Geodimeter	299,792.5	0.05
1967	Simkin, Lukin, Sikora, and Strelenskii	U.S.S.R.	Microwave interferometer	299,792.56	0.11
1973	Evenson, Wells, Peterson, Danielson, and Day	U.S.A.	Laser techniques	299,792.4574	0.0012

* See "Some Recent Determinations of the Velocity of Light, III" by Joseph F. Mulligan, *American Journal of Physics*, October 1976. Here the 1974 measurements of Blayney et al. at the National Physical Laboratory in England are described. They are in very close agreement with the results of Evenson et al. (1973).

Definition des Meters:

299792458. Teil der Strecke, die Licht in 1 s zurücklegt.

also: $c = 299792458\ m/s$