

Frustrated total reflection / Microwaves 4.5.09-00

- What you can learn about ...
- Transmission
  - Reflection
  - Absorption
  - Refraction
  - Phase velocity
  - Total reflection
  - Surface waves
  - Frustrated total reflection
  - Tunnel effect

Principle:

In the first part, the transmission and reflection characteristics of glass, acrylic glass and metal are studied with a microwave transmitter-receiver pair and are compared to each other.

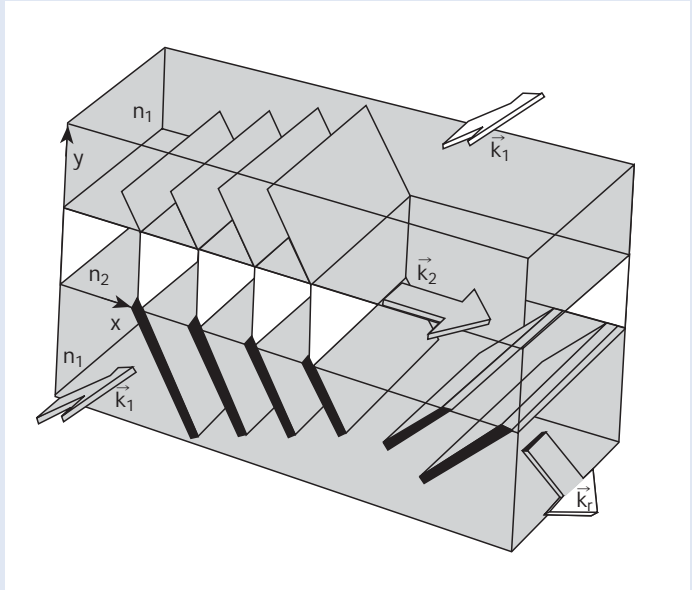
In the second part, total reflection of microwaves on a prismatic surface is suppressed by bringing a second prism with the same refractive index close to the first one.



**What you need:**

Microwave transmitter with clystron	11740.01	1
Microwave receiver	11740.02	1
Microwave power supply, 220 VAC	11740.93	1
Screen, metal, 300 mm x 300 mm	08062.00	2
Glass plate, clear glass, 200 x 300 x 4 mm	08204.00	1
Plexiglas plate 200 x 200 x 4 mm	11613.00	1
Barrel base -PASS-	02006.55	4
Plate holder, opening width 0...10 mm	02062.00	1
Supporting block 105 x 10 5x 57 mm	02073.00	2
Prism, synthetic resin	06873.00	2
Digital multimeter 2010	07128.00	1
Screened cable, BNC, $l = 750$ mm	07542.11	1
Adapter BNC socket/4 mm plug pair	07542.27	1
Vernier caliper, plastic	03011.00	1

**Complete Equipment Set, Manual on CD-ROM included**  
**Frustrated total reflection / Microwaves P2450900**



Frustrated total internal reflection.

Tasks:

1. Determination of the reflecting and transmitting characteristics of glass, acrylic glass and metal.
2. Observation of the effect of frustrated total reflection and determination of the transmitted irradiance as a function of distance  $d$  to the prismatic surface. The refractive index of the prism material can be calculated by determining the attenuation coefficient  $\gamma$ .