

```

In[234]:= T[string_] := Style[string, FontFamily -> "TeX Gyre Pagella", FontSize -> 20]
customStyle = {
  PlotStyle -> Thickness[0.006],
  Frame -> True,
  FrameStyle -> Black,
  FrameTicksStyle -> {Directive[18, FontFamily -> "TeX Gyre Pagella"],
    Directive[18, FontFamily -> "TeX Gyre Pagella"]},
  ImageSize -> {550, 350}
};

```

```

In[236]:= h0 := 6220
η := 2.4 * 10^(-4)

Tan[ArcCos[x]] // Simplify;

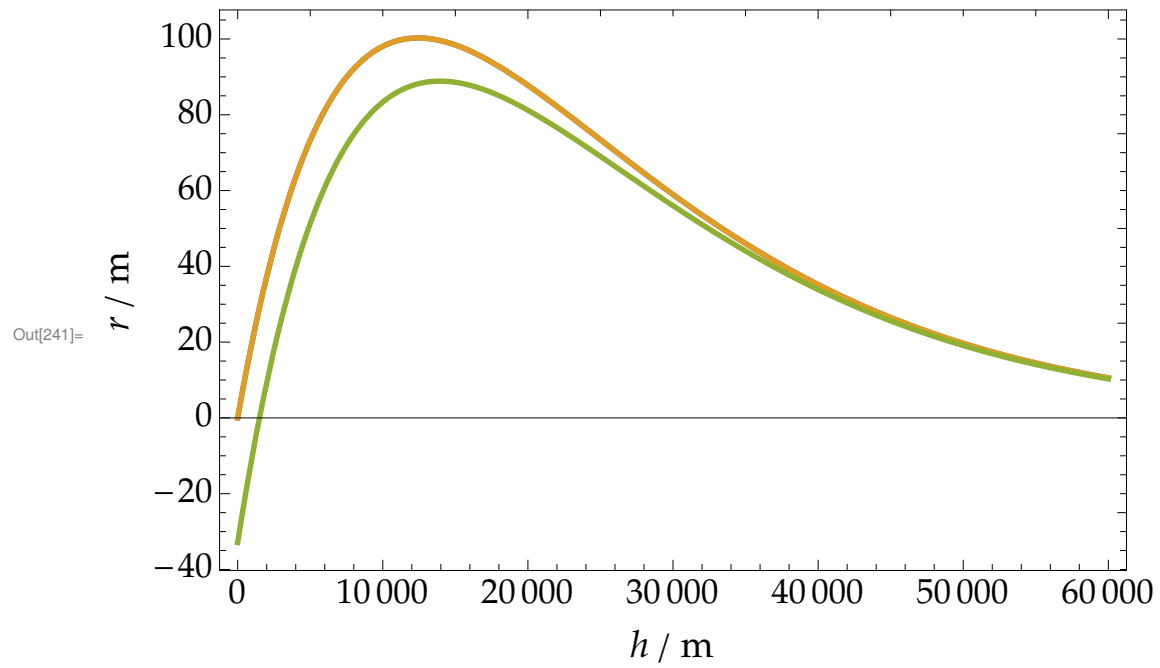
r[h_, hobs_] := (h - hobs) Tan[ArcCos[1 / (1 + η e^(-(h) / h0))]]
r2[h_, hobs_] := (h) Sqrt[2 η e^(-h / h0)] (*Näherung*)
Plot[
  {r[h, 0],
   r2[h, 0],
   r[h, 1500]}, {h, 60000, 0},
  Evaluate@customStyle,
  FrameLabel -> {T["h / m"], T["r / m"]}

dr[h_, hobs_] := D[r[h, hobs], h]

FindRoot[dr[x, 0], {x, 2 h0}]
r[x /. %, 0]

FindRoot[dr[x, 1000], {x, 2 h0}]
r[x /. %, 1000]

```



Out[243]= $\{x \rightarrow 12\,439.8\}$

Out[244]= 100.265

Out[245]= $\{x \rightarrow 13\,439.8\}$

Out[246]= 92.5206

In[247]:=

```

Ecrit := 10^13
npart := 5
 $\alpha$ num := 0.99
ncrit[ $\alpha$ _, Eprim_] :=
  IntegerPart[Log[Ecrit / Eprim / npart] / Log[ $\alpha$  / npart]] HeavisideTheta[Eprim - Ecrit]

Etot[ $\alpha$ _, Eprim_] := Eprim  $\alpha$ ^(ncrit[ $\alpha$ , Eprim])

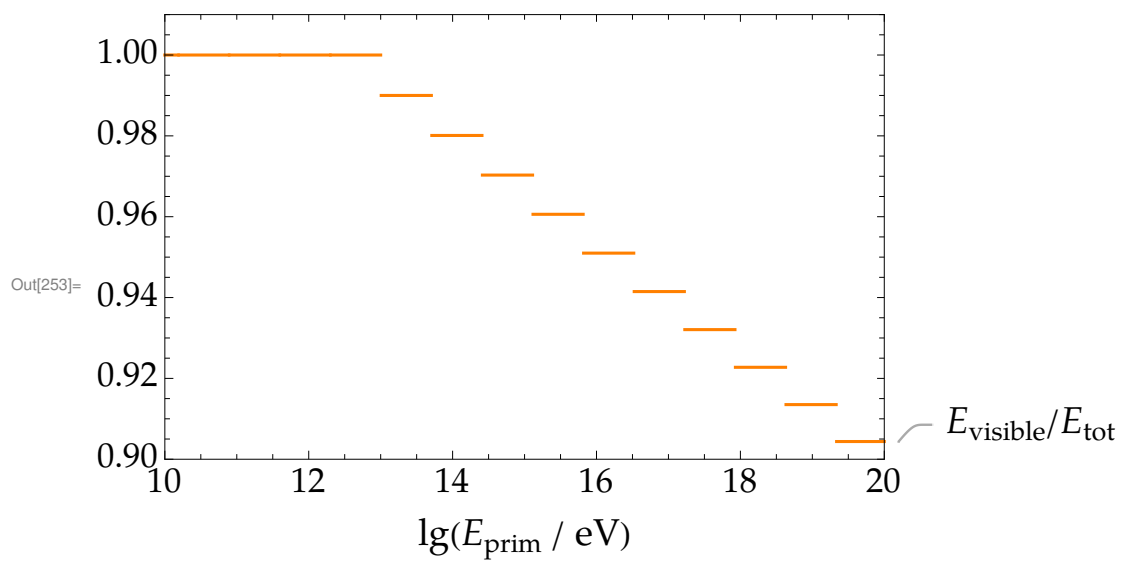
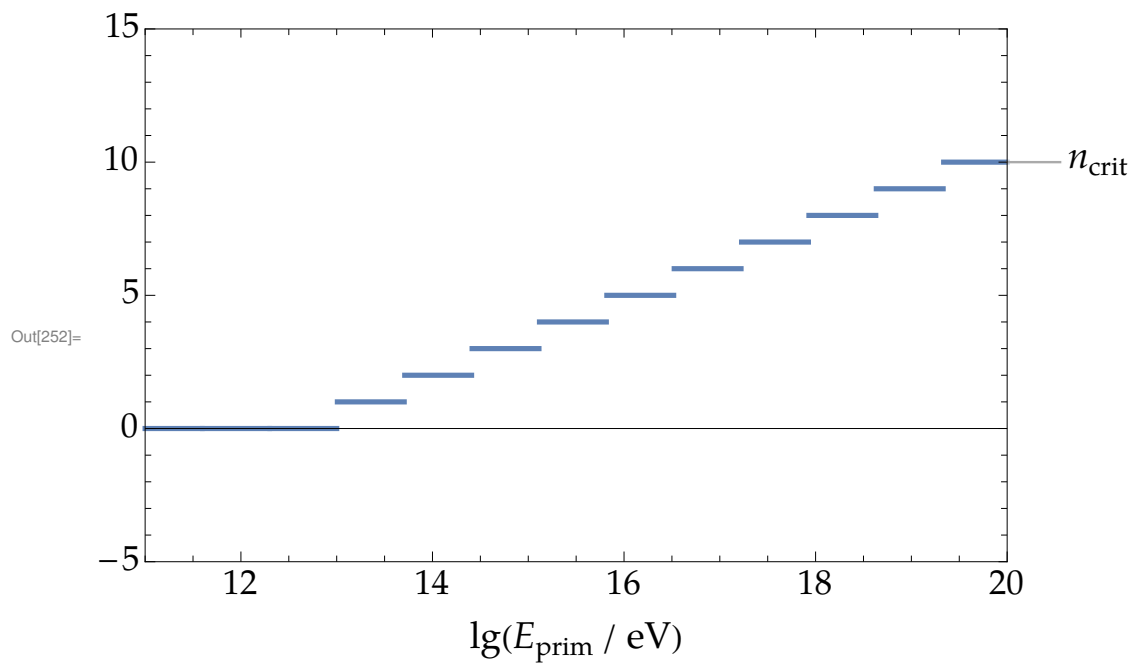
Plot[{ncrit[ $\alpha$ num, 10^lge]}, {lge, 11, 20},
  PlotRange → {{11, 20}, {-5, 15}},
  Evaluate@customStyle,
  PlotLabels → {T["ncrit"]},
  FrameLabel → {T["lg(Eprim / eV)"]}

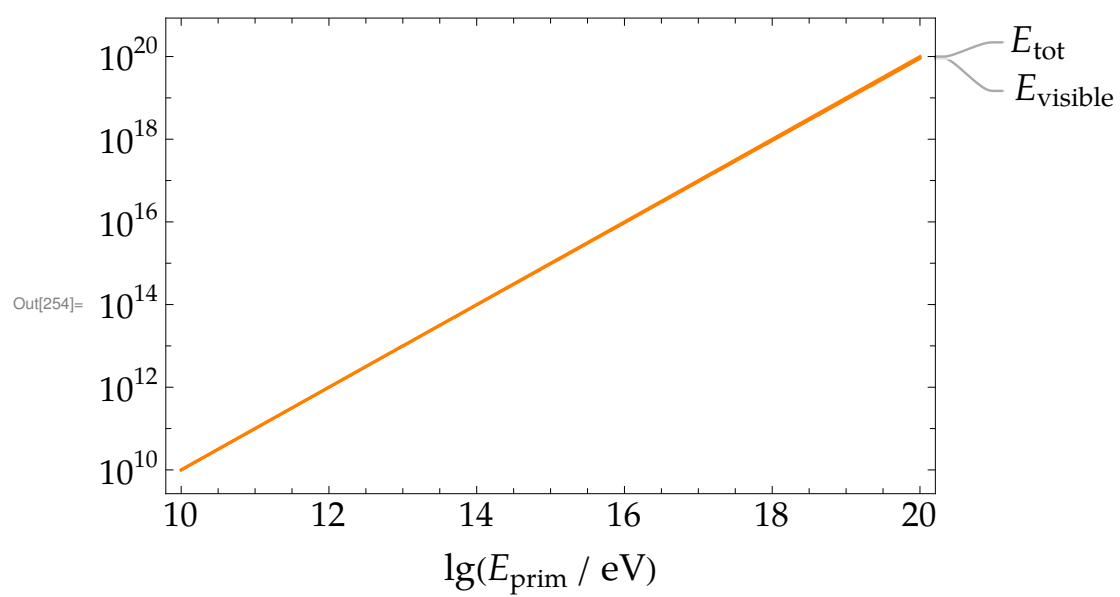
Plot[{Etot[ $\alpha$ num, 10^lge] / 10^lge}, {lge, 10, 20},
  PlotRange → {{10, 20}, {0.9, 1.01}},
  PlotStyle → Orange,
  Evaluate@customStyle,
  PlotLabels → {T["Evisible/Etot"]},
  FrameLabel → {T["lg(Eprim / eV)"]}

LogPlot[{Etot[ $\alpha$ num, 10^lge], 10^lge}, {lge, 10, 20},

  PlotStyle → Orange,
  Evaluate@customStyle,
  PlotLabels → {T["Evisible"], T["Etot"]},
  FrameLabel → {T["lg(Eprim / eV)"]}

```





```

In[255]:= (* example *)
lin1 = LogPlot[
  {(10^lge)^(-0.1)},
  {lge, 8, 11},
  Evaluate@customStyle,
  PlotRange -> {{8, 22}, {0.005, 0.4}},
  FrameLabel -> {T["lg(Eprim / eV)"], T["Φ/a.u."]}
];
lin2 = LogPlot[
  {(10^lge)^(-0.1),
   Etot[0.8, 10^lge]^(-0.1)},
  {lge, 11, 22},
  Evaluate@customStyle
];
Show[lin1, lin2]

```

Out[257]=

