```
Re[Assuming[Λ ∈ Reals, Solve[(((Λ/3)) (r^3)) - r + s == 0, r]]]
```

$$\left\{\left\{\mathrm{Re}\left[r\to \frac{2^{1/3}}{\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}+\frac{\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}{2^{1/3}\,\Lambda}\right]\right\},\right.$$

$$\left\{\mathrm{Re}\left[r\to -\frac{1+i\sqrt{3}}{2^{2/3}\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}-\frac{\left(1-i\sqrt{3}\right)\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}{2\times 2^{1/3}\,\Lambda}\right]\right\},$$

$$\left.\left\{\mathrm{Re}\left[r\to -\frac{1-i\sqrt{3}}{2^{2/3}\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}-\frac{\left(1+i\sqrt{3}\right)\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}{2\times 2^{1/3}\,\Lambda}\right]\right\}\right\}$$

$$\frac{2^{1/3}}{\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}+\frac{\left(-3\, s\, \Lambda^2+\sqrt{-4\,\Lambda^3+9\, s^2\,\Lambda^4}\right)^{1/3}}{2^{1/3}\,\Lambda}\ \texttt{// FullSimplify}$$

$$\frac{2\times 2^{1/3}\,\Lambda+\left(-6\, s\, \Lambda^2+2\sqrt{\Lambda^3\left(-4+9\, s^2\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\left(-3\, s\, \Lambda^2+\sqrt{\Lambda^3\left(-4+9\, s^2\,\Lambda\right)}\right)^{1/3}}$$

$$\frac{2\times 2^{1/3}\,\Lambda+\left(-6\, s\, \Lambda^2+2\sqrt{\Lambda^3\left(-4+9\, s^2\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\left(-3\, s\, \Lambda^2+\sqrt{\Lambda^3\left(-4+9\, s^2\,\Lambda\right)}\right)^{1/3}}\ \texttt{/. s} \to \texttt{1 (* s = } r_s \to \texttt{1*)}$$

$$\frac{2\times 2^{1/3}\,\Lambda+\left(-6\,\Lambda^2+2\sqrt{\Lambda^3\left(-4+9\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\left(-3\,\Lambda^2+\sqrt{\Lambda^3\left(-4+9\,\Lambda\right)}\right)^{1/3}}$$

$$\frac{2\times 2^{1/3}\,\Lambda+\left(-6\,\Lambda^2+2\sqrt{\Lambda^3\left(-4+9\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\left(-3\,\Lambda^2+\sqrt{\Lambda^3\left(-4+9\,\Lambda\right)}\right)^{1/3}}\ \texttt{/.}\ \Lambda\to\ (\texttt{10\^{}(-52)})\ \texttt{// N (* DeSitter *)}$$

$$\frac{2\times 2^{1/3}\,\Lambda+\left(-6\,\Lambda^2+2\sqrt{\Lambda^3\left(-4+9\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\left(-3\,\Lambda^2+\sqrt{\Lambda^3\left(-4+9\,\Lambda\right)}\right)^{1/3}}\ \texttt{/.}\ \Lambda\to\ -(\texttt{10\^{}(-52)})\ \texttt{// N (* Anti-DeSitter *)}$$

$1.73205\times 10^{26}+8.16044\times 10^{11}\, i$

-6.624×10^{11}

So only anti-de Sitter case Λ<0 produces real value, Planck satellite data give Λ ~ ± 10^(-25) kg/m^3, above uses Λ ~ ± 10^(-52) 1/m^2 value

$$\frac{2\times 2^{1/3}\,\Lambda + \left(-6\,\Lambda^2 + 2\sqrt{\Lambda^3\,\left(-4+9\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\,\left(-3\,\Lambda^2 + \sqrt{\Lambda^3\,\left(-4+9\,\Lambda\right)}\right)^{1/3}}$$ /. Λ → (10^(-25)) // N (* DeSitter *)

$$\frac{2\times 2^{1/3}\,\Lambda + \left(-6\,\Lambda^2 + 2\sqrt{\Lambda^3\,\left(-4+9\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\,\left(-3\,\Lambda^2 + \sqrt{\Lambda^3\,\left(-4+9\,\Lambda\right)}\right)^{1/3}}$$ /. Λ → -(10^(-25)) // N (* Anti-DeSitter *)

$5.47723\times 10^{12} + 0.0107422\,i$

0.989989

$$\frac{2\times 2^{1/3}\,\Lambda + \left(-6\,s\,\Lambda^2 + 2\sqrt{\Lambda^3\,\left(-4+9\,s^2\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\,\left(-3\,s\,\Lambda^2 + \sqrt{\Lambda^3\,\left(-4+9\,s^2\,\Lambda\right)}\right)^{1/3}}$$ /. s → 0.1 /. Λ → -(10^(-25)) //

N (* Anti-DeSitter, s = r_s *)

0.0898942

Schwarzchild radius of star ~ Chadrasekhar limit:

1.4 * 2950 m = 4130 m

Schwarzchild radius of sun ~ 2950 m

$$\frac{2\times 2^{1/3}\,\Lambda + \left(-6\,s\,\Lambda^2 + 2\sqrt{\Lambda^3\,\left(-4+9\,s^2\,\Lambda\right)}\right)^{2/3}}{2\,\Lambda\,\left(-3\,s\,\Lambda^2 + \sqrt{\Lambda^3\,\left(-4+9\,s^2\,\Lambda\right)}\right)^{1/3}}$$ /. s → 4130 /. Λ → -(10^(-25)) //

N (* Anti-DeSitter, s = r_s *)

4129.99

So the introduction of the Λ Anti-de Sitter term barely alters the size of stationary, uncharged, non-rotating black holes