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In[ ]:= ClearAll["Global`*"]
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$$BC = CO = d;$$

$$BO = \sin[\alpha_2] \frac{BC}{\sin[\frac{\pi}{2} - \frac{\alpha_2}{2}]} = \frac{2 d \sin[\alpha_2]}{\cos[\frac{\alpha_2}{2}]} = \frac{2 d \sin[\frac{\alpha_2}{2}] \cos[\frac{\alpha_2}{2}]}{\cos[\frac{\alpha_2}{2}]};$$

$$BO = 2 d \sin\left[\frac{\alpha_2}{2}\right];$$

$$AB = \frac{BC}{\sin[\gamma]} = \frac{d}{\sin[\gamma]};$$

$$\frac{BO}{\sin[\phi]} = \frac{AB}{\sin[\frac{\pi}{2} - \frac{\phi}{2}]} = \frac{AB}{\cos[\frac{\phi}{2}]};$$

$$\frac{2 d \sin[\frac{\alpha_2}{2}]}{2 \sin[\frac{\phi}{2}] \cos[\frac{\phi}{2}]} = \frac{\frac{d}{\sin[\gamma]}}{\cos[\frac{\phi}{2}]};$$

$$\frac{\sin[\frac{\alpha_2}{2}]}{\sin[\frac{\phi}{2}]} = \frac{1}{\sin[\gamma]};$$

$$\sin\left[\frac{\phi}{2}\right] = \sin\left[\frac{\alpha_2}{2}\right] \sin[\gamma];$$

$$\phi = 2 \operatorname{ArcSin}\left[\sin\left[\frac{\alpha_2}{2}\right] \sin[\gamma]\right];$$

$$\alpha_2 = 2 \operatorname{ArcSin}\left[\frac{\sin[\frac{\phi}{2}]}{\sin[\gamma]}\right];$$

$$BO = 2 CO \sin\left[\frac{\alpha_2}{2}\right];$$

$$\theta = \frac{\phi}{2};$$

$$BE = BO \sin[\theta];$$

$$EO = BO \cos[\theta];$$

$$FO = CO \cos[\gamma];$$

$$DE = FC = CO \sin[\gamma];$$

$$BD = BE - DE;$$

$$DC = EF = \sqrt{BC^2 - BD^2};$$

$$\operatorname{Simplify}\left[\frac{FO^2 + EO^2 - EF^2}{2 FO EO}\right];$$

$$\eta = \operatorname{ArcCos}\left[\frac{\sin[\frac{\alpha_2}{2}] - \sin[\gamma] \sin[\frac{\phi}{2}]}{\cos[\gamma] \cos[\frac{\phi}{2}]}\right]$$

$$\varphi = \pi - \eta - \alpha_1;$$

$$\alpha_1 = \pi - \eta - \varphi;$$