```
comptonRatio[a_, th_] := 1/(1 + a (1 - Cos[th]));
comptonSection[a_, th_] := Evaluate[
    Block[{p = comptonRatio[a, th]},
      p^2 (p + p^-1 - Sin[th]^2)/2
     ] // Simplify
   ];
PolarPlot[comptonSection[#, th] & /@ {0., .1, 1., 10.} // Evaluate, {th, 0, 2 π}]
```