```
comptonElectronEnergy[a_, th_] := Evaluate[
   a (1 - comptonRatio[a, th])
  ];
comptonThetaByEnergy[a_, e_] := Evaluate@Module[{
     th, sol, conds = 0 ≤ e ≤ 2 a^2/(1 + 2 a) && a > 0
    },
    sol = Assuming[conds,
      Solve[comptonElectronEnergy[a, th] == e
          && Sequence @@ conds
          && 0 ≤ th ≤ π, th, Reals
       ] // Refine
     ];
    If[Dimensions[sol] ≠ {1, 1}, Abort[], th /. sol[[1, 1]]]
   ];
comptonSectionByEnergy[a_, e_] := Evaluate@Simplify[ConditionalExpression[
    comptonSection[a, comptonThetaByEnergy[a, e]]
     * Sin[comptonThetaByEnergy[a, e]]
     * (∂_e comptonThetaByEnergy[a, e]),
    0 ≤ e ≤ 2 a^2/(1 + 2 a)
   ]]
comptonSectionByEnergy[α, e] // First
```