```
In[432]:=
        file = "C:\\Users\\sajib\\src\\DRalgo\\examples\\ah_pot.m";

        raw = Import[file, "Text"];

In[434]:=
        (*find the LAST V[phi_,T_]:=... line (DRalgo always puts at end)*)
        lines = StringSplit[raw, "\n"];
        potLine = Select[lines, StringContainsQ["V[phi_, T_]"]][[-1]];

        rhs = StringTrim[StringSplit[potLine, ":="][[2]]];

In[437]:=
        expr = ToExpression[rhs /. {"ϕ" → ϕ, "Yϕ" → Yϕ}];

        ClearAll[V];
        V[ϕ_, T_] := expr;

In[440]:=
        (*tiny floor for logs*)eps = 10.^-30;

        exprSafe =
          expr /. {(*sqrt(x)→sqrt(|x|)*)Sqrt[x_] :> Sqrt[Abs[x]], (*log(x)→log(max(|x|,eps))*)
            Log[x_] :> Log[Max[Abs[x], eps]], (*any half-integer power x^(n/2)→ |x|^(n/2)*)
            Power[x_, p_Rational] /; Denominator[p] == 2 :> Power[Abs[x], p]};

In[442]:=
        Clear[V];
        V[ϕ_, T_] := exprSafe;

In[444]:=
        (*4D input couplings*)g1Four = 0.54;
        lam4 = 1.65 * 10^-3;
        m0sq4 = -(130.^2);
        Yphi4 = 1.0;

        (*simple 4D→3D matching,as in Python*)
        g1sq3[T_] := g1Four^2 * T;
        lam3[T_] := lam4 * T;
        msq3[T_] := m0sq4 + (0.30 * g1Four^2 + 0.10 * lam4) * T^2;
        mu3USfun[T_] := Max[g1Four * T, 1.0];
        g13[T_] := Sqrt[g1sq3[T]];


        ClearAll[parRules];

In[454]:=
        parRules[T_] := {g1 → g13[T], λ → lam3[T], msq → msq3[T], Yϕ → Yphi4, μ3US → mu3USfun[T]};
```

```
In[455]:=
```

```
ClearAll[Vnum, dVnum];

Vnum[phi_?NumericQ, T_?NumericQ] :=
  Module[{ex}, ex = exprSafe /. parRules[T] /. ϕ → phi;
    N[ex]];

dVnum[phi_?NumericQ, T_?NumericQ] := Module[{h}, h = 10^-3 * Max[1., Abs[phi]] + 10^-5;
    (Vnum[phi + h, T] - Vnum[phi - h, T]) / (2 h)];
```

```
In[458]:=
```

```
vev = 500.;
phiMin = 0.;
phiMax = 1.1 * vev;
step = 1.;  (*sampling resolution for ListLinePlot*)

Manipulate[Module[{vPlot, dVdata, dVPlot}, (*1) V vs phi (standard Plot)*)
  vPlot = Plot[Vnum[ϕ, T], {ϕ, phiMin, phiMax}, PlotRange → All,
    PlotPoints → 200, AxesLabel → {"ϕ", "V(ϕ,T)"}, PlotLabel →
      Row[{"V(ϕ,T) at  T = ", NumberForm[T, {5, 1}], " MeV"}], ImageSize → 400];
  (*2) Sample derivative explicitly,then ListLinePlot*)
  dVdata = Table[{phi, dVnum[phi, T]}, {phi, 1., phiMax, step}];
  dVPlot =
    ListLinePlot[dVdata, PlotRange → All, AxesLabel → {"ϕ", "dV/dϕ (ϕ,T)"}, PlotLabel →
      Row[{"dV/dϕ at  T = ", NumberForm[T, {5, 1}], " MeV"}], ImageSize → 300];
  GraphicsRow[{vPlot, dVPlot}, Spacings → 2]],
 {{T, 0.}, 0., 3.5 * vev, Appearance → "Labeled"}]
```

```
Out[462]=
```