In[1]:=
```
Charting`$InteractiveHighlighting = False
```
Out[1]=
```
False
```

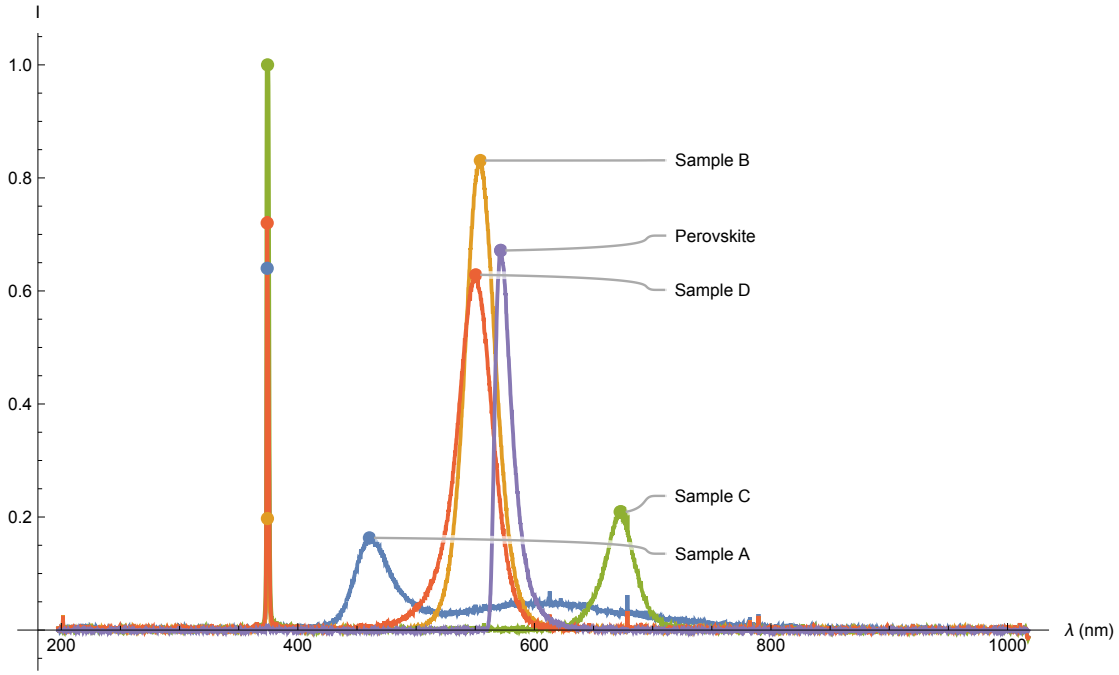
LASER dataset for the samples A, B, C, D and perovskite

In[2]:=
```
τ = {"Sample A", "Sample B", "Sample C", "Sample D", "Perovskite"};
δ =
  Dataset[Import[ToString@StringForm["/Users/giovannigravili/Library/Mobile
            Documents/com~apple~CloudDocs/LM
            MANO/Notebooks/NP/esperimento/LASER/laser_``.txt", #],
          "Table", "HeaderLines" → 0, "FieldSeparators" → "\t",
          "NumberPoint" → ".", CharacterEncoding → "UTF8"]][
       All, Range[1, 2]][All, <|"λ (nm)" → 1, "I" → 2|>] & /@
   {"sample_A", "sample_B", "sample_C",
    "sample_D",
    "perovskite2"};
```

In[4]:=
```
δ = Transpose[{#[All, "λ (nm)"], #[All, "I"]} // Normal] & /@ δ;
```

In[5]:=
```
λpk = FindPeaks[#, 100, Automatic, 0.1] & /@
    (TimeSeriesResample@TimeSeries[#2, {#1}] & @@@ (Transpose[#] & /@ δ)) // Normal
```
Out[5]=
```
{{{374.073, 0.640095}, {460.5, 0.163117}},
 {{374.278, 0.197324}, {554.3, 0.830747}},
 {{374.38, 1.}, {672.472, 0.209141}, {673.291, 0.209379}},
 {{374.073, 0.720259}, {550.409, 0.628496}}, {{571.504, 0.671659}}}
```

In[6]:=
```
ListLinePlot[δ, PlotRange → All, AxesLabel → {"λ (nm)", "I"}] //
 Show[#, ListPlot[λpk, PlotLabels → τ], ImageSize → Large, PlotRange → All] &
```
Out[6]=

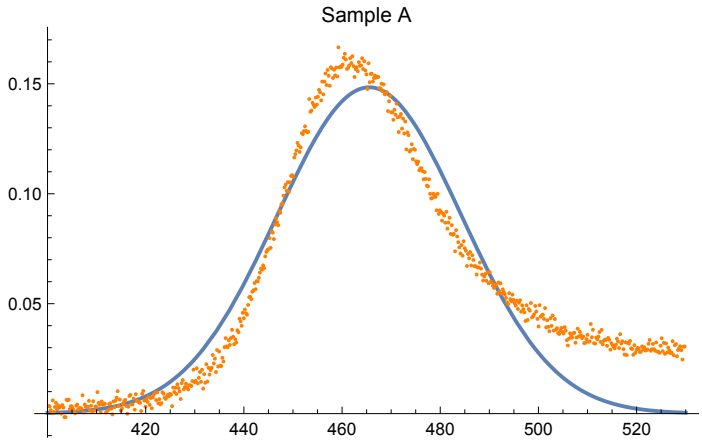


In[7]:=
```
Λ = {{400, 530}, {500, 650}, {600, 750}, {450, 650}, {550, 650}};
κ = Cases[#1, {x_, y_} /; #2[[1]] ≤ x ≤ #2[[2]] & @@@ Transpose[{δ, Λ}];
```

In[9]:=
```
ϕ = NonlinearModelFit[#1, A e^-((λ-μ)^2/(2 σ^2)), {A, {μ, #2}, σ}, λ] & @@@
    Transpose[{κ, {460.5, 554.3, 672.47, 550.4, 571.5}}];
```

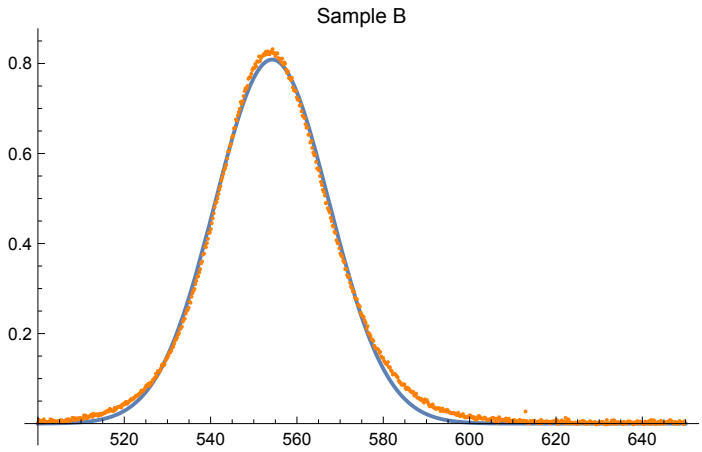
In[10]:=
```
{Show[Plot[#1[λ], {λ, #3[[1]], #3[[2]]}, ImageSize → Medium, PlotLabel → #4],
      ListPlot[#2, PlotStyle → {Orange, PointSize[Small]}], PlotRange → All],
   Column[{#1["ANOVATable"], "", #1["ParameterTable"]}]} & @@@
  Transpose[{ϕ, κ, Λ, τ}] // Quiet // TableForm
```

Out[10]//TableForm=



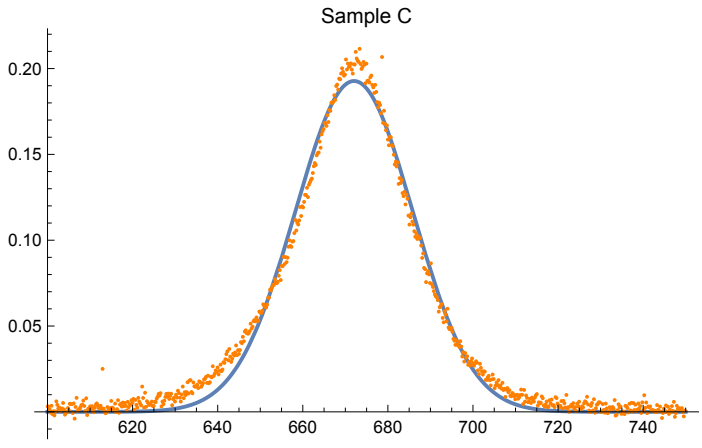
	DF	SS	MS
Model	3	3.33954	1.11318
Error	588	0.142996	0.00024319
Uncorrected Total	591	3.48254	
Corrected Total	590	1.47775	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.148411	0.00155118	95.6765	0.	
μ	465.551	0.226788	2052.8	0.	
σ	18.7921	0.226815	82.8519	0.	



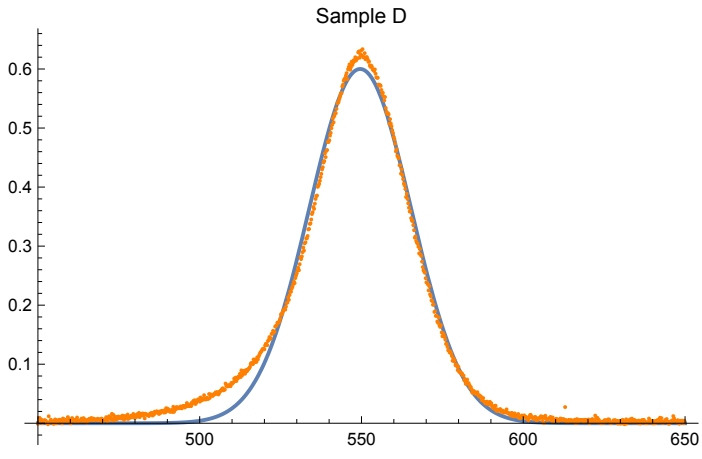
	DF	SS	MS
Model	3	68.4555	22 .8185
Error	664	0.122707	0.000184799
Uncorrected Total	667	68.5782	
Corrected Total	666	45.7676	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.808636	0.00162721	496.945	0.	
μ	554.26	0.0307381	18 031.7	0.	
σ	13.2287	0.0307377	430.374	0.	



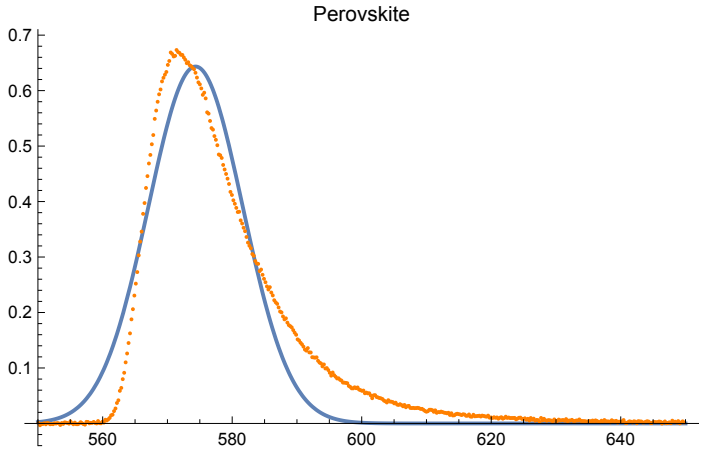
	DF	SS	MS
Model	3	3.95992	1.31997
Error	651	0.0298337	0.0000458
Uncorrected Total	654	3.98976	
Corrected Total	653	2.54211	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.192741	0.000803042	240.013	0.	
μ	672.052	0.0663241	10 132.9	0.	
σ	13.786	0.0663233	207.861	0.	



	DF	SS	MS
Model	3	44.8615	14.9538
Error	891	0.282091	0.0003166
Uncorrected Total	894	45.1436	
Corrected Total	893	30.961	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.600014	0.00195221	307.352	0.	
μ	549.599	0.0590979	9299.8	0.	
σ	15.7305	0.0590969	266.181	0.	



	DF	SS	MS
Model	3	23.804	7.93468
Error	439	1.16107	0.0026448
Uncorrected Total	442	24.9651	
Corrected Total	441	17.4937	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.643393	0.00830639	77.4576	3.85314	
μ	574.345	0.10877	5280.35	0.	
σ	7.29657	0.108786	67.0728	7.79074	

UV dataset for the samples A, B, C, D

In[11]:=
```
τ = {"Sample A", "Sample B", "Sample C", "Sample D"};
δ =
  Dataset[Import[ToString@StringForm["/Users/giovannigravili/Library/Mobile
          Documents/com~apple~CloudDocs/LM
          MANO/Notebooks/NP/esperimento/uvNewCorrect/sample``.txt",
        #], "Table", "HeaderLines" → 0, "FieldSeparators" → "\t",
      "NumberPoint" → ".", CharacterEncoding → "UTF8"]][All, Range[1, 2]][
    All, <|"λ (nm)" → 1, "I" → 2|>] & /@ {"A", "B", "C", "D"};
```

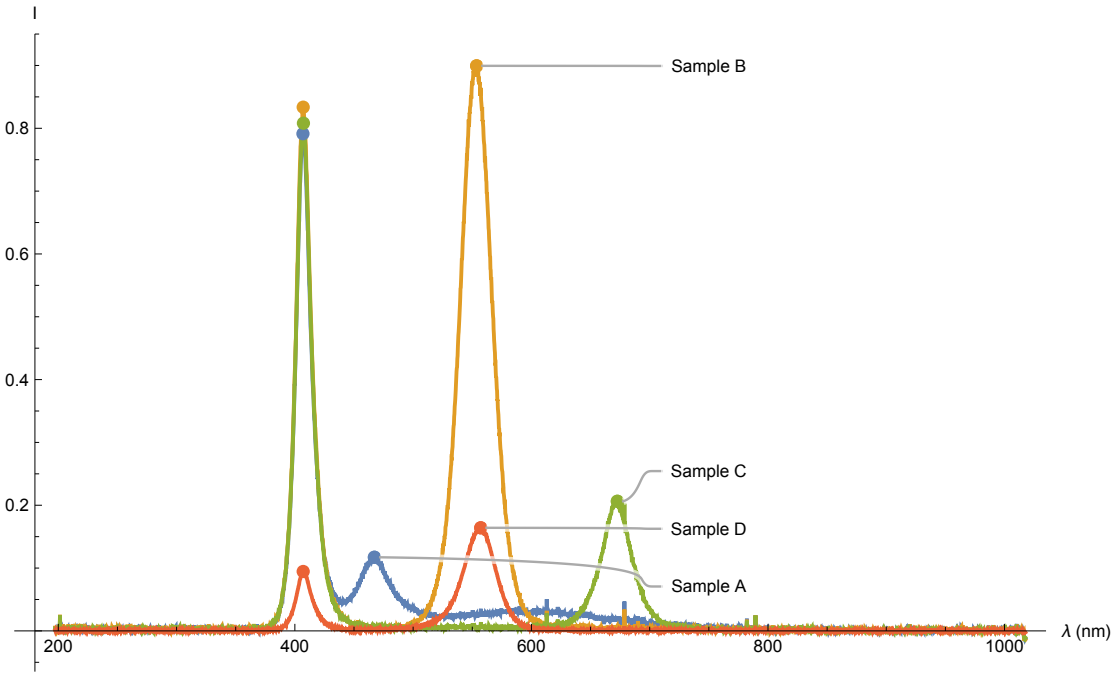
In[13]:=
```
δ = Transpose[{#[All, "λ (nm)"], #[All, "I"]} // Normal] & /@ δ;
```

In[14]:=
```
λpk = FindPeaks[#, 50, Automatic, 0.05] & /@
   (TimeSeriesResample@TimeSeries[#2, {#1}] & @@@ (Transpose[#] & /@ δ)) // Normal
```

Out[14]=
```
{{{406.842, 0.791361}, {467.259, 0.117173}},
 {{407.046, 0.833625}, {553.686, 0.899401}},
 {{407.251, 0.808092}, {672.677, 0.206275}},
 {{407.046, 0.0945755}, {557.167, 0.164092}}}
```

In[15]:=
```
ListLinePlot[δ, PlotRange → All, AxesLabel → {"λ (nm)", "I"}] //
 Show[#, ListPlot[λpk, PlotLabels → τ], ImageSize → Large, PlotRange → All] &
```

Out[15]=



In[16]:=
```
Λ = {{440, 500}, {480, 650}, {600, 750}, {500, 650}};
κ = Cases[#1, {x_, y_} /; #2[[1]] ≤ x ≤ #2[[2]] & @@@ Transpose[{δ, Λ}];
```

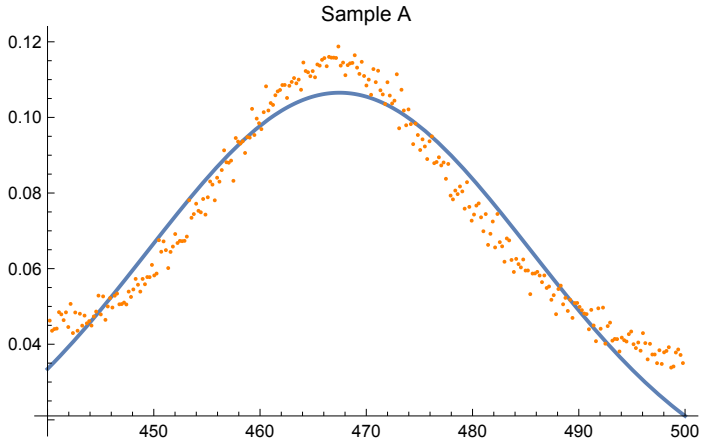
In[18]:=
```
ϕ = NonlinearModelFit[#1, A e^-((λ-μ)^2/(2 σ^2)), {A, {μ, #2}, σ}, λ] & @@@
  Transpose[{κ, {467.25, 553.68, 672.47, 557.4}}]
```

Out[18]=

$$\left\{\text{FittedModel}\left[0.106529\ e^{-0.00153351\ (\ll 1\gg)^2}\right], \text{FittedModel}\left[0.875347\ e^{-0.00256873\ (-\ll 18\gg+\lambda)^2}\right],\right.$$
$$\left.\text{FittedModel}\left[0.191232\ e^{-0.00237737\ (\ll 1\gg)^2}\right], \text{FittedModel}\left[0.157592\ e^{-0.00236518\ (\ll 1\gg)^2}\right]\right\}$$

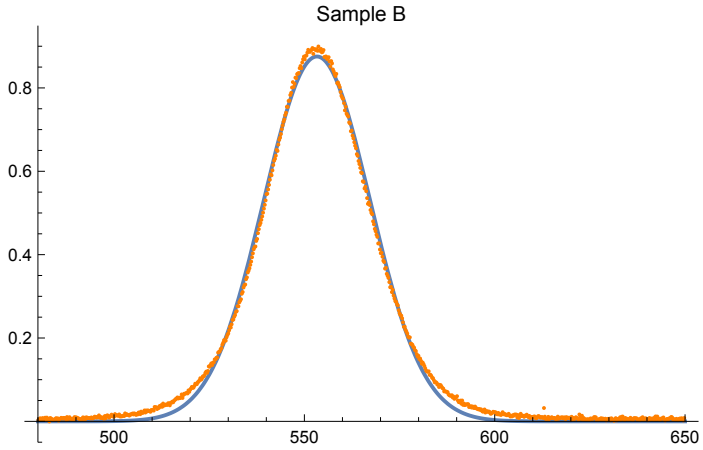
In[19]:=
```
{Show[Plot[#1[λ], {λ, #3[[1]], #3[[2]]}, ImageSize → Medium, PlotLabel → #4],
      ListPlot[#2, PlotStyle → {Orange, PointSize[Small]}], PlotRange → All],
    Column[{#1["ANOVATable"], "", #1["ParameterTable"]}]} & @@@
  Transpose[{ϕ, κ, Λ, τ}] // Quiet // TableForm
```

Out[19]//TableForm=



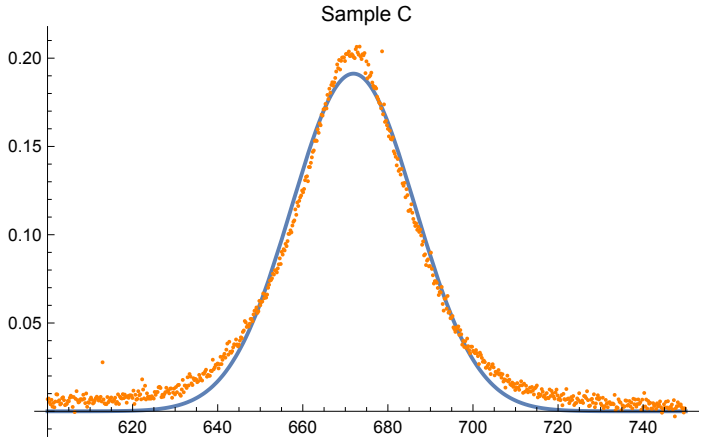
	DF	SS	MS
Model	3	1.61686	0.538954
Error	269	0.0121337	0.00004510
Uncorrected Total	272	1.629	
Corrected Total	271	0.182624	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.106529	0.000721465	147.656	1.7627	
μ	467.477	0.145401	3215.09	0.	
σ	18.0569	0.176268	102.44	1.5823	



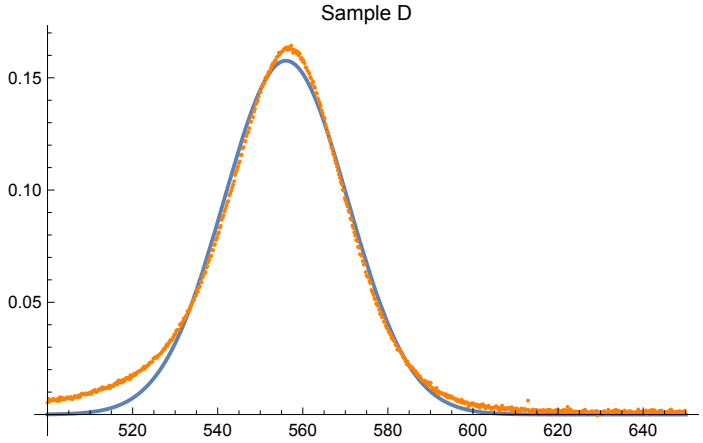
	DF	SS	MS
Model	3	84.6172	28.2057
Error	754	0.171484	0.000227432
Uncorrected Total	757	84.7887	
Corrected Total	756	57.893	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.875347	0.00175761	498.033	0.	
μ	553.295	0.0323471	17104.9	0.	
σ	13.9517	0.0323466	431.317	0.	



	DF	SS	MS
Model	3	4.10082	1.36694
Error	651	0.039738	0.00006104
Uncorrected Total	654	4.14056	
Corrected Total	653	2.48463	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.191232	0.000903615	211.63	0.	
μ	671.905	0.0791273	8491.44	0.	
σ	14.5023	0.0791263	183.28	0.	



	DF	SS	MS
Model	3	2.85658	0.952194
Error	664	0.0145978	0.0000219
Uncorrected Total	667	2.87118	
Corrected Total	666	1.77811	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.157592	0.000535448	294.318	0.	
μ	556.035	0.057043	9747.66	0.	
σ	14.5396	0.0570424	254.891	0.	

Green, red and UV LEDs spectra

In[20]:=
```
τ = {"Green LED", "Red LED", "UV LED"};
δ =
  Dataset[Import[ToString@StringForm["/Users/giovannigravili/Library/Mobile
          Documents/com~apple~CloudDocs/LM
          MANO/Notebooks/NP/esperimento/LEDs/``LedTxt.txt", #],
        "Table", "HeaderLines" → 0, "FieldSeparators" → "\t",
        "NumberPoint" → ".", CharacterEncoding → "UTF8"]][All, Range[1, 2]][
    All, <|"λ (nm)" → 1, "I" → 2|>] & /@ {"green", "red", "uv"};
```

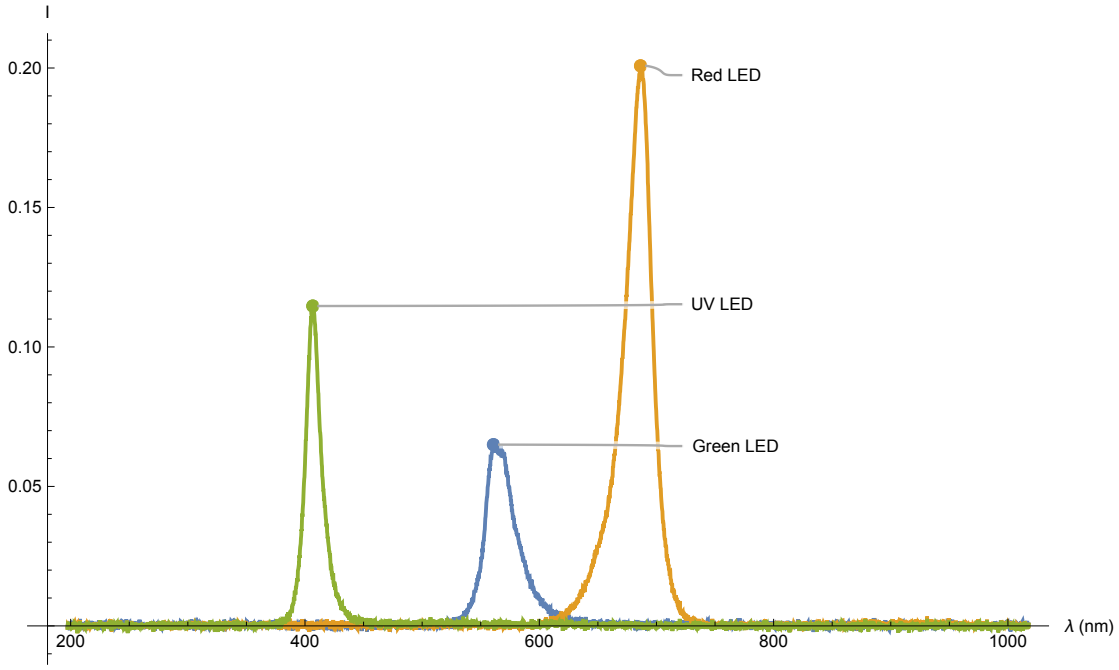
In[22]:=
```
δ = Transpose[{#[All, "λ (nm)"], #[All, "I"]} // Normal] & /@ δ;
```

In[23]:=
```
λpk = FindPeaks[#, 100, Automatic, 0.05] & /@
   (TimeSeriesResample@TimeSeries[#2, {#1}] & @@@ (Transpose[#] & /@ δ)) // Normal
```

Out[23]=
```
{{{560.854, 0.0649853}}, {{686.398, 0.200778}}, {{406.637, 0.114673}}}
```

In[24]:=
```
ListLinePlot[δ, PlotRange → All, AxesLabel → {"λ (nm)", "I"}] //
 Show[#, ListPlot[λpk, PlotLabels → τ], ImageSize → Large, PlotRange → All] &
```

Out[24]=



In[25]:=
```
Λ = {{500, 650}, {580, 800}, {360, 450}};
κ = Cases[#1, {x_, y_} /; #2[[1]] ≤ x ≤ #2[[2]] & @@@ Transpose[{δ, Λ}];
```

In[27]:=
```
ϕ = NonlinearModelFit[{#1, A e^-((λ-μ)^2/(2 σ^2))}, {A, {μ, #2}, σ}, λ] & @@@
  Transpose[{κ, {560.9, 686.4, 406.6}}]
```

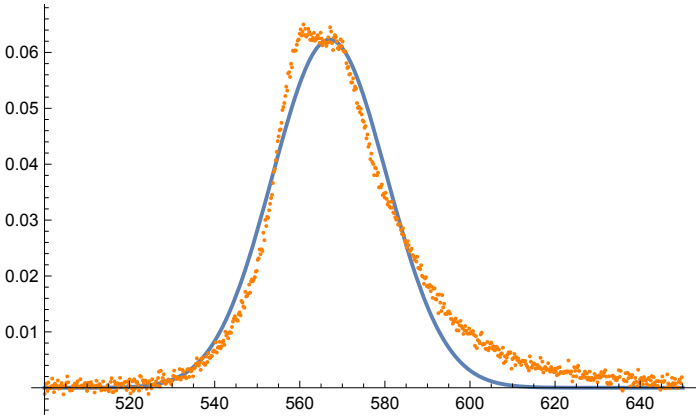
Out[27]=

$$\left\{\text{FittedModel}\left[0.0623024\ e^{-0.00275522\ (\ll 1\gg)^2}\right],\ \text{FittedModel}\left[0.183749\ e^{-0.00299913\ (\ll 1\gg)^2}\right],\ \text{FittedModel}\left[0.10579\ e^{-0.00947149\ (\ll 1\gg)^2}\right]\right\}$$

In[28]:=
```
{Show[Plot[#1[λ], {λ, #3[[1]], #3[[2]]}, ImageSize → Medium, PlotLabel → #4],
    ListPlot[#2, PlotStyle → {Orange, PointSize[Small]}], PlotRange → All],
   Column[{#1["ANOVATable"], "", #1["ParameterTable"]}]} & @@@
  Transpose[{ϕ, κ, Λ, τ}] // Quiet // TableForm
```

Out[28]//TableForm=

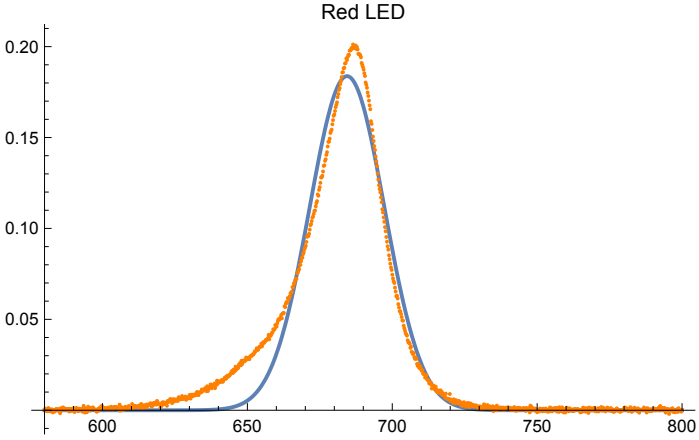
Green LED



	DF	SS	MS
Model	3	0.412719	0.137573
Error	664	0.00884482	0.000013
Uncorrected Total	667	0.421563	
Corrected Total	666	0.26772	

	Estimate	Standard Error	t-Statistic	P-	Valu
A	0.0623024	0.000433495	143.721	0.	
μ	567.	0.108231	5238.78	0.	
σ	13.4712	0.10823	124.469	0.	

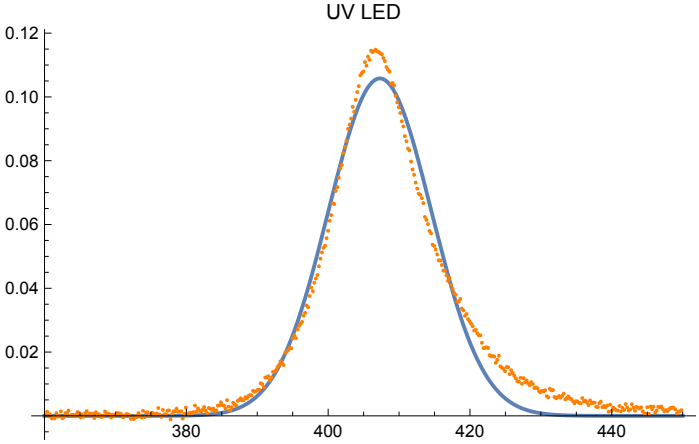
Red LED



	DF	SS	MS
Model	3	3.36313	1.12104
Error	954	0.0776968	0.0000814
Uncorrected Total	957	3.44083	
Corrected Total	956	2.59732	

	Estimate	Standard Error	t-Statistic	P-	Value
A	0.183749	0.00110745	165.92	0.	
μ	684.39	0.0898578	7616.37	0.	
σ	12.9118	0.0898569	143.693	0.	

UV LED



	DF	SS	MS
Model	3	0.665053	0.221684
Error	412	0.00903571	0.0000219
Uncorrected Total	415	0.674089	
Corrected Total	414	0.451651	

	Estimate	Standard Error	t-Statistic	P-Value
A	0.10579	0.000744038	142.184	0.
μ	407.296	0.0590058	6902.65	0.
σ	7.26567	0.0590055	123.136	0.