

# AD\_Excitation

1D ground state

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useful function

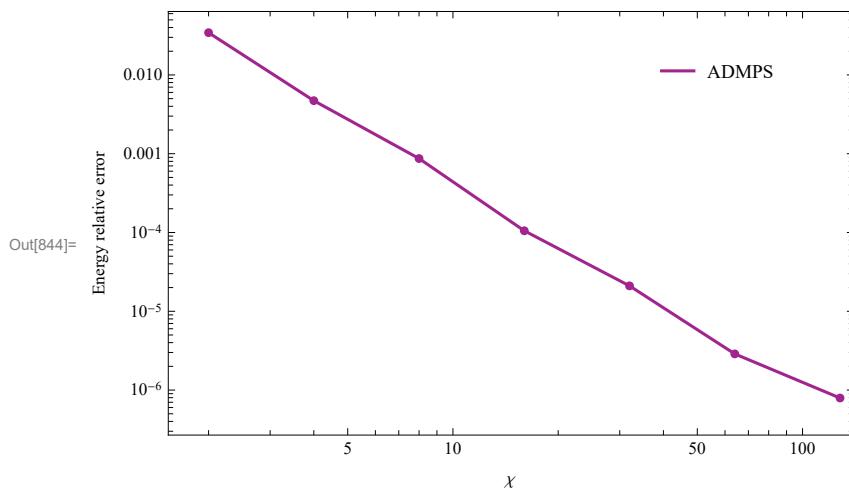
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Heisenberg

relative error- $X$

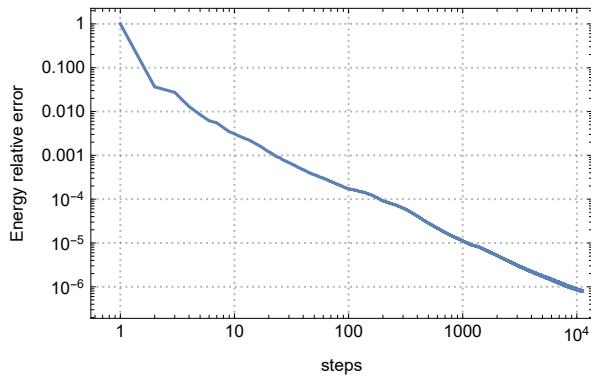
error exponentially-dependent on  $X$

```
In[841]:= exact = 0.25 - Log[2];
          | 对数
AD_MPS_energy = Table[{2^i, Load_energy["E:\\1 - research\\4.11 - "
          | 表格
          | 自然常数
Excitation_iPEPS\\AD_Excitation\\data\\Heisenberg{Float64}(0.5,
1.0, 1.0, 1.0)\\D2_\u03c7" <> ToString[2^i] <> ".log"]}, {i, 1, 7}];
          | 转换为字符串
AD_MPS_energy_aberror = Table[{AD_MPS_energy[[i, 1]], Abs[
          | 表格
          | 绝对值
(exact - AD_MPS_energy[[i, 2]]) / exact]}, {i, 1, Length[AD_MPS_energy]}];
          | 长度
ListLogLogPlot[{AD_MPS_energy_aberror}, PlotTheme -> "Scientific",
          | 点集的双对数图
          | 绘图主题
Mesh -> All, Joined -> True, PlotRange -> All,
          | 网格 | 全部 | 连接点 | 真 | 绘制范围 | 全部
PlotStyle -> {colors [[1]], colors [[2]], colors [[3]], Blue},
          | 绘图样式
| 蓝色
PlotLegends -> Placed[{"ADMPS"}, {Scaled[{0.7, 0.8}], {0, 0}}],
          | 绘图的图例 | 放置
| 比例坐标
Joined -> {True, True}, Mesh -> All, PlotTheme -> "Scientific",
          | 连接点 | 真 | 真 | 网格 | 全部 | 绘图主题
FrameLabel -> {"Energy relative error", None}, {HoldForm["\u03c7"], None}],
          | 无 | 保持表达式
ImageSize -> 400]
          | 图像尺寸
```

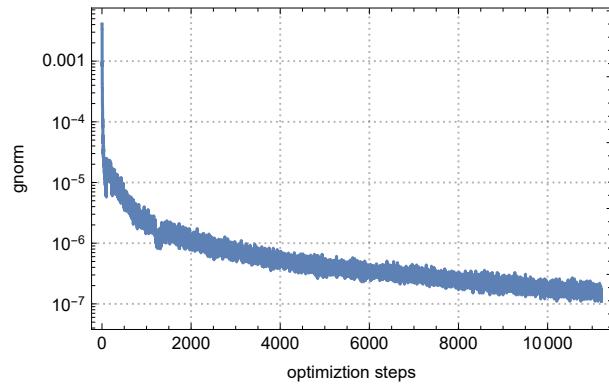


## relative error-steps

error exponentially-dependent on steps

E-steps  $\chi=128$ 

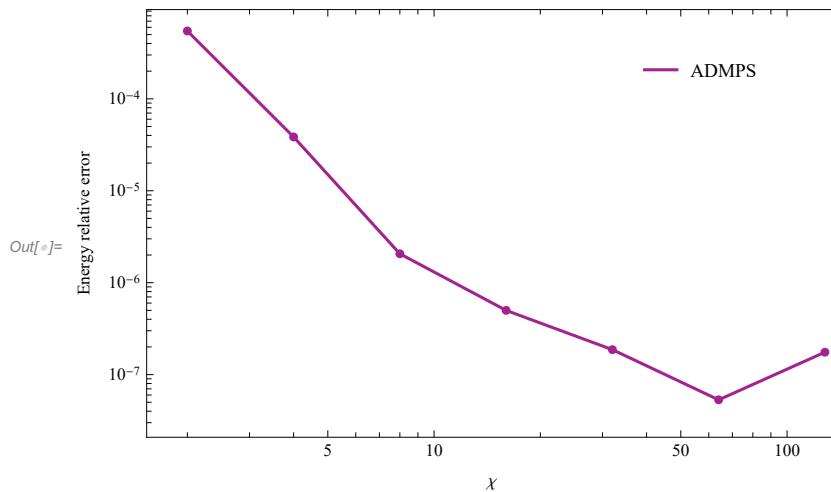
Out[840]=

gnorm-steps  $\chi=128$ 

## TFIsing at critical point $g=0.5$

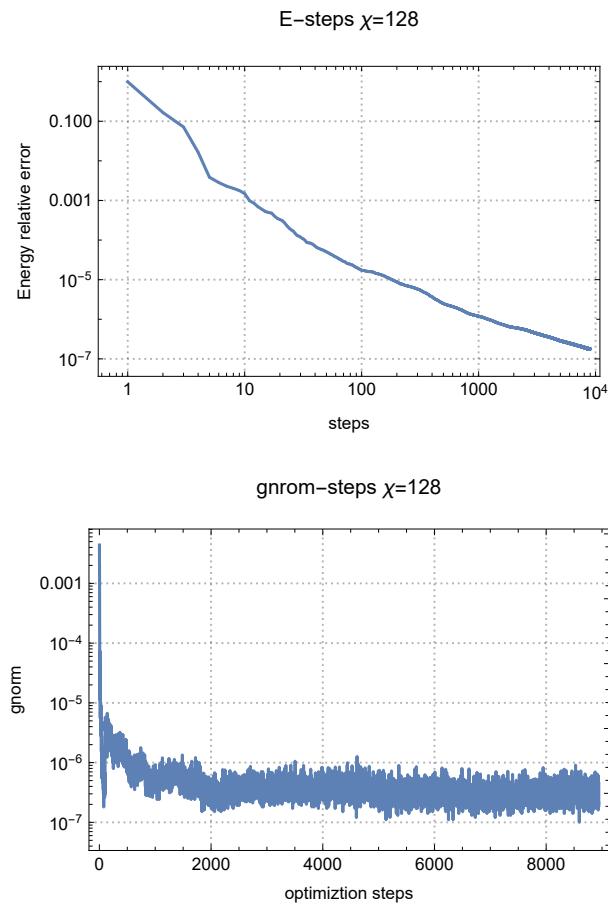
relative error- $\chi$

error exponentially-dependent on  $\chi$



relative error-steps

error exponentially-dependent on steps



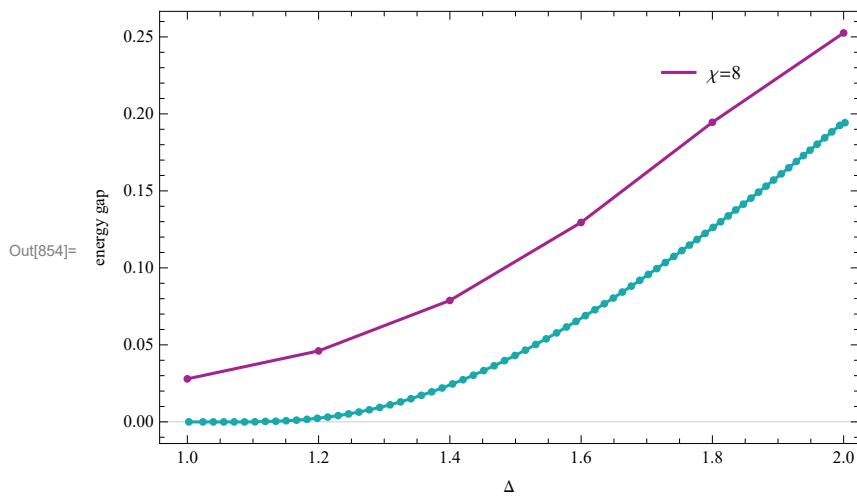
## 1D Excitation

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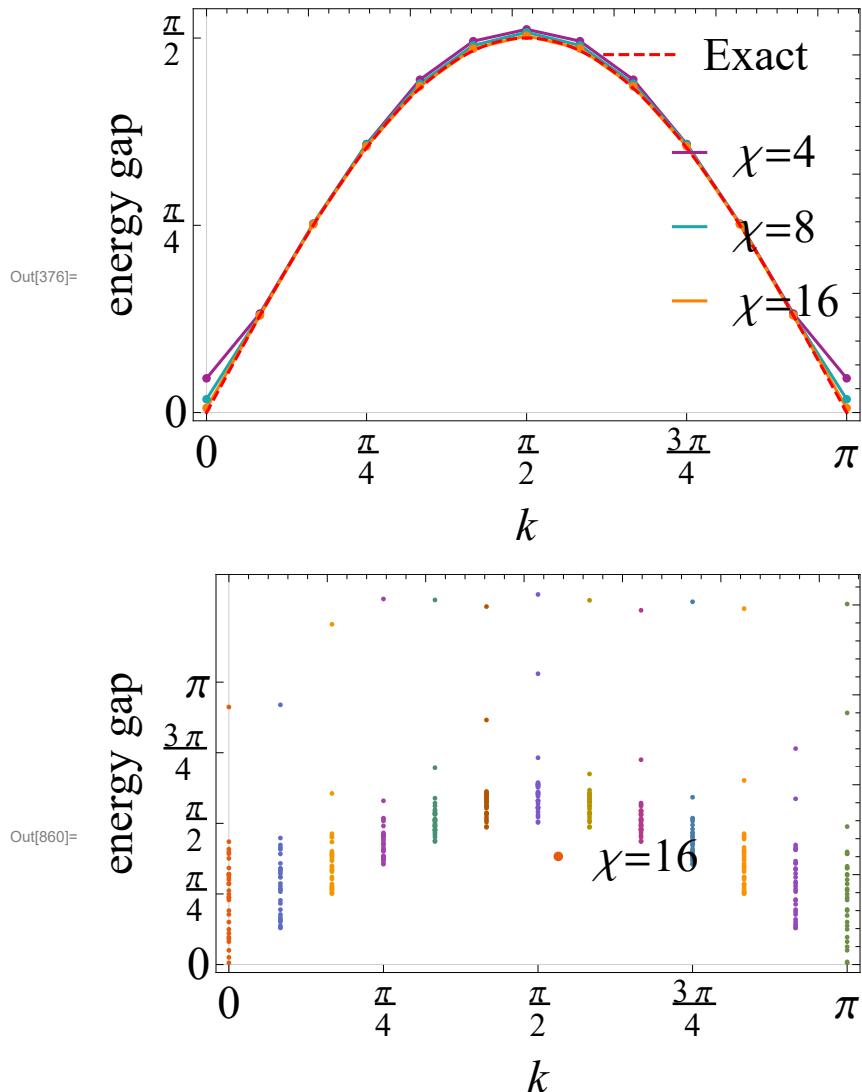
U1

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XXZ  $\Delta=1$

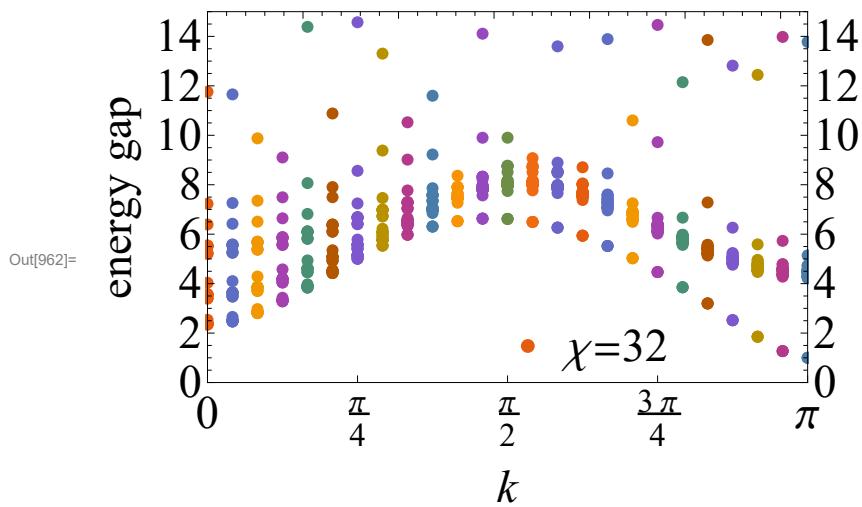
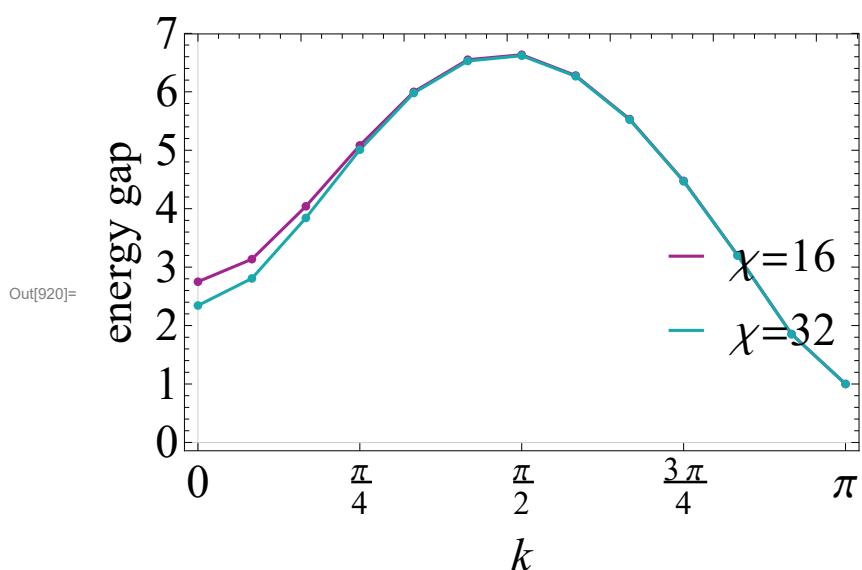
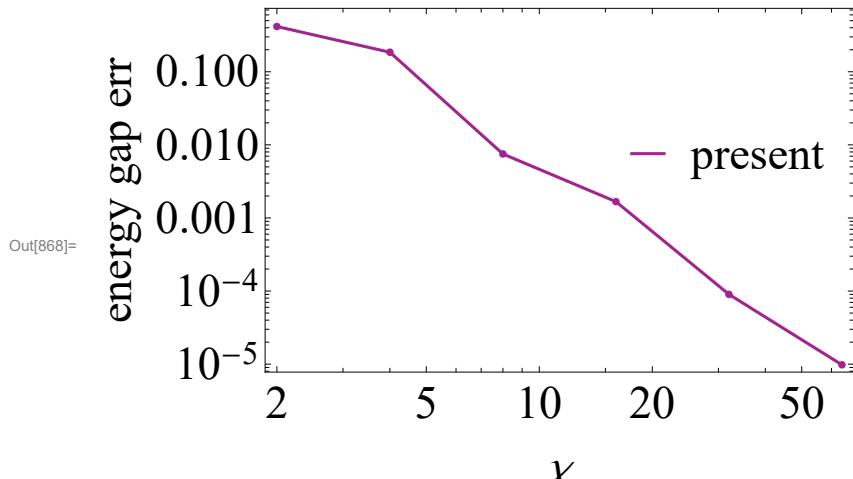


## Heisenberg S=1/2



## Heisenberg S=1

$k = \pi$  energy gap err



PHYSICAL REVIEW B 85, 100408(R) (2012) Fig.3

