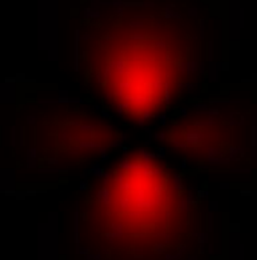


Kvantově-mechanický model atomu



Hustota pravděpodobnosti

- jaká je pravděpodobnost najít elektron na různých místech v atomu
- udává tvar atomového orbitalu

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Př.:

hustota zalidnění: počet lidí v oblasti / plocha oblasti

hustota pravděpodobnosti: pravděpodobnost nalezení elektronu v nějaké oblasti / plocha oblasti

Hustota pravděpodobnosti

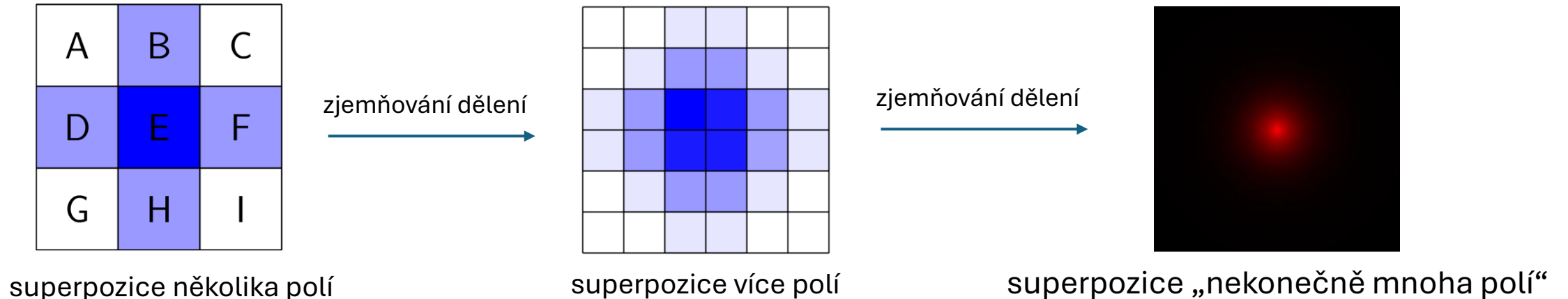
- jaká je pravděpodobnost najít elektron na různých místech v atomu
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Od kvantových lodí k atomovému orbitalu:



Orbitaly atomu vodíku

- tvar orbitalů udává **celková hustota pravděpodobnosti** nalezení elektronu
- abychom získali tvar orbitalů, budeme celkovou hustotu pravděpodobnosti skládat ze dvou informací:

Orbitaly atomu vodíku

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Jak se mění hustota pravděpodobnosti v závislosti na:

(1) směru (úhlu), kterým od jádra jdeme (úhlová část hustoty pravděpodobnosti, ozn. U)

(2) vzdálenosti od jádra (část hustoty pravděpodobnosti závislá na vzdálenosti, ozn. R)

Orbitaly atomu vodíku

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Jak se mění hustota pravděpodobnosti v závislosti na:

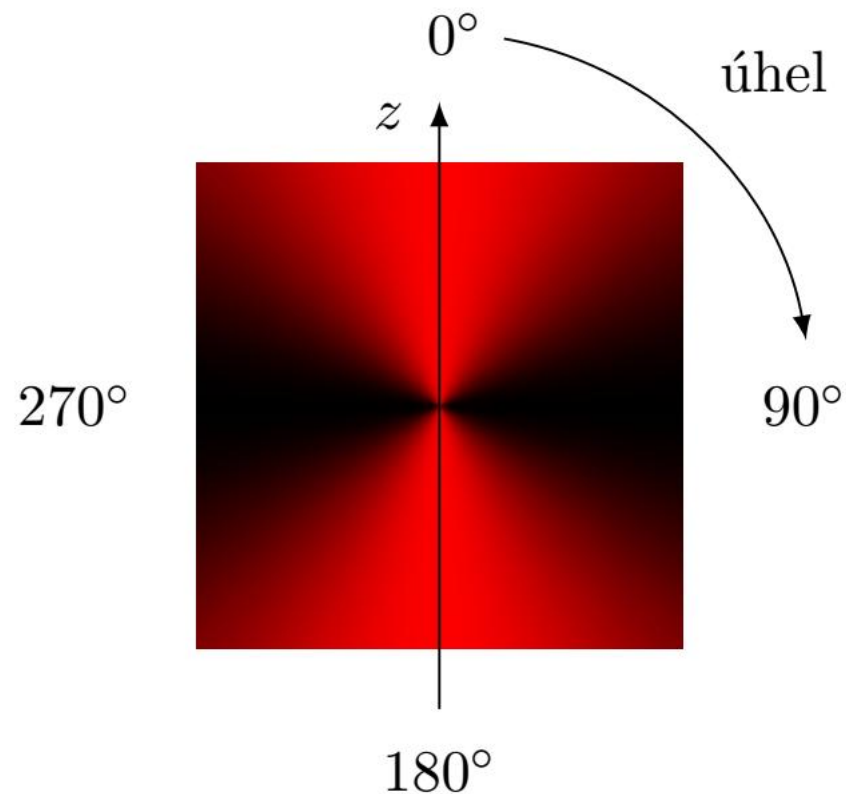
(1) směru (úhlu), kterým od jádra jdeme (úhlová část hustoty pravděpodobnosti, ozn. U)

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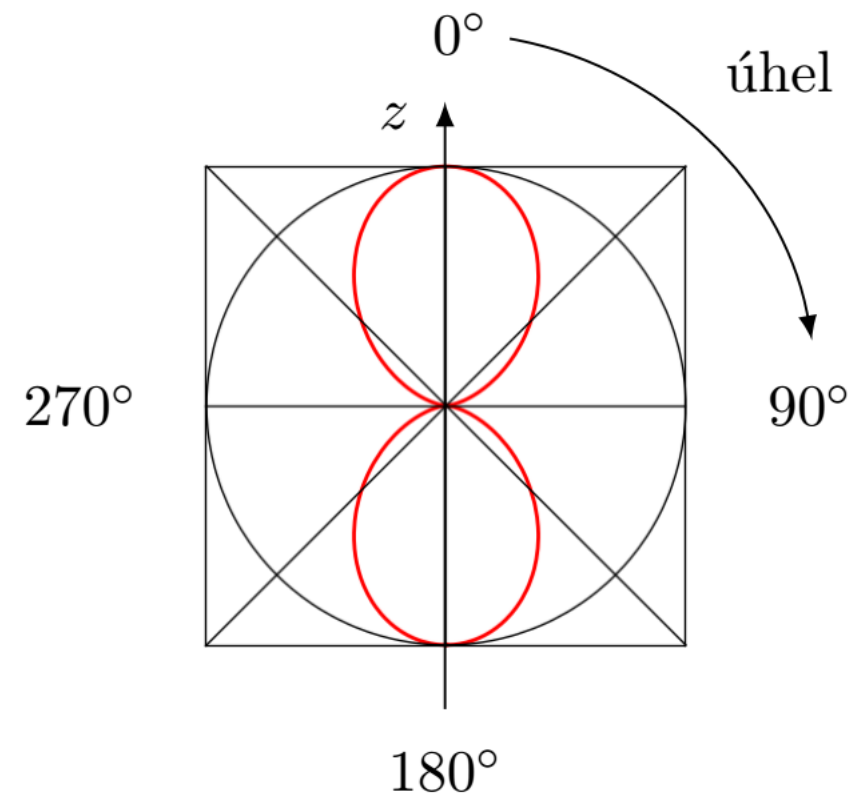
- každou informaci budeme zakreslovat jiným typem grafu, které pak složíme dohromady

(1) Závislost hustoty pravděpodobnosti na směru (úhlu)

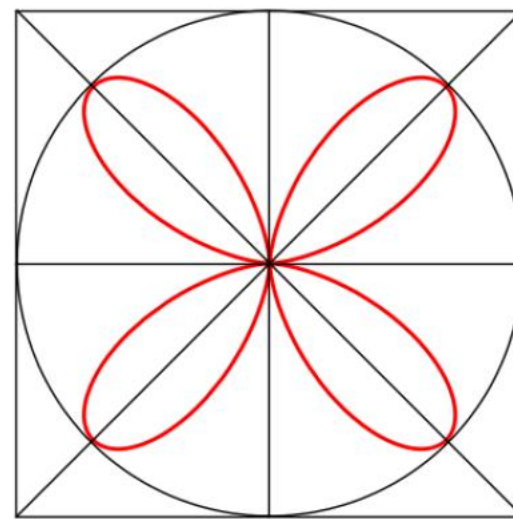
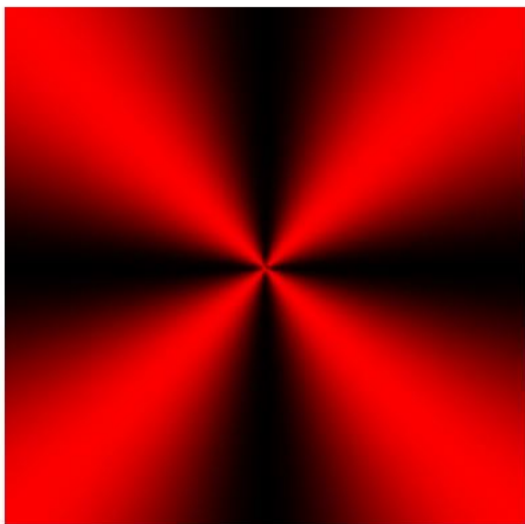
„paprskový“ graf



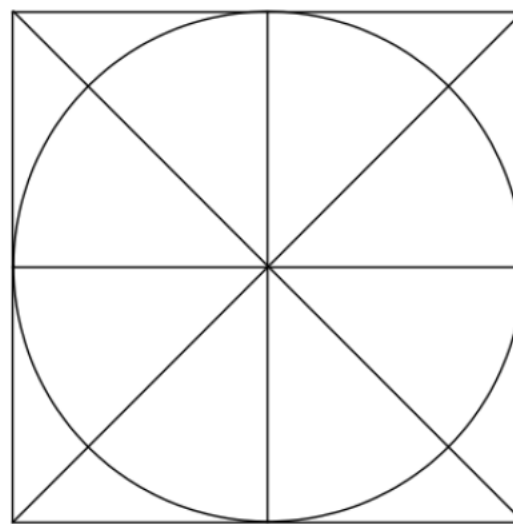
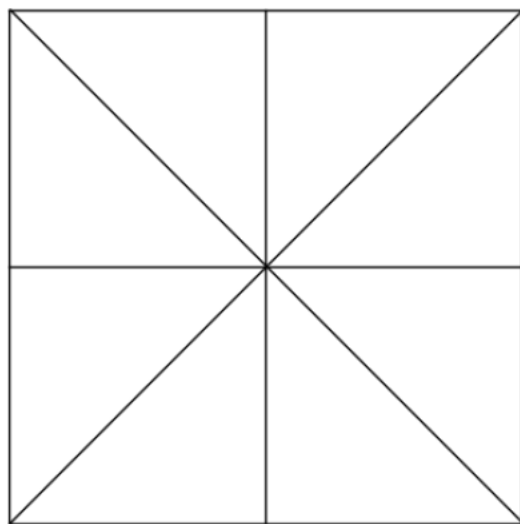
polární graf



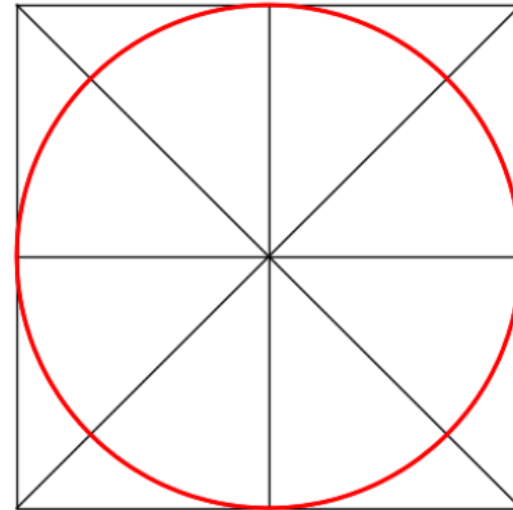
Ve kterém směru je hustota pravděpodobnosti
největší, resp. **nejnižší**?



Nakreslete polární i „paprskový“ graf, pokud je hustota pravděpodobnosti ve všech směrech stejná



Nakreslete polární i „paprskový“ graf, pokud je hustota pravděpodobnosti ve všech směrech stejná

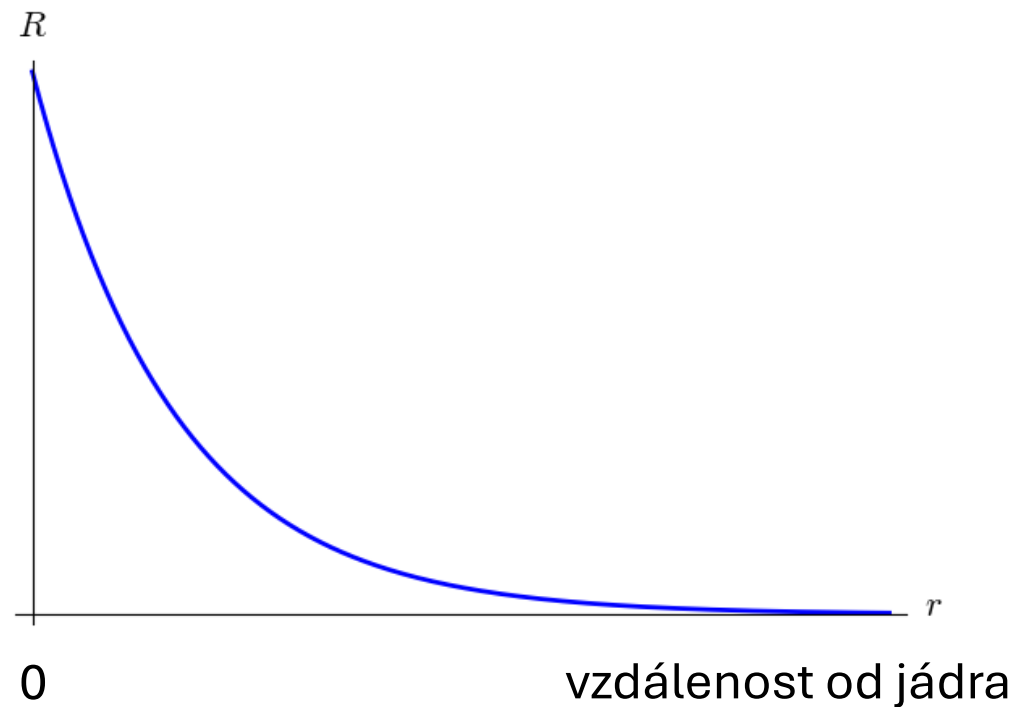


vzdálenost od jádra

(2) Závislost hustoty pravděpodobnosti na vzdálenosti od jádra

- kartézský graf

část hustoty
pravděpodobnosti
závislá na vzdálenosti
od jádra

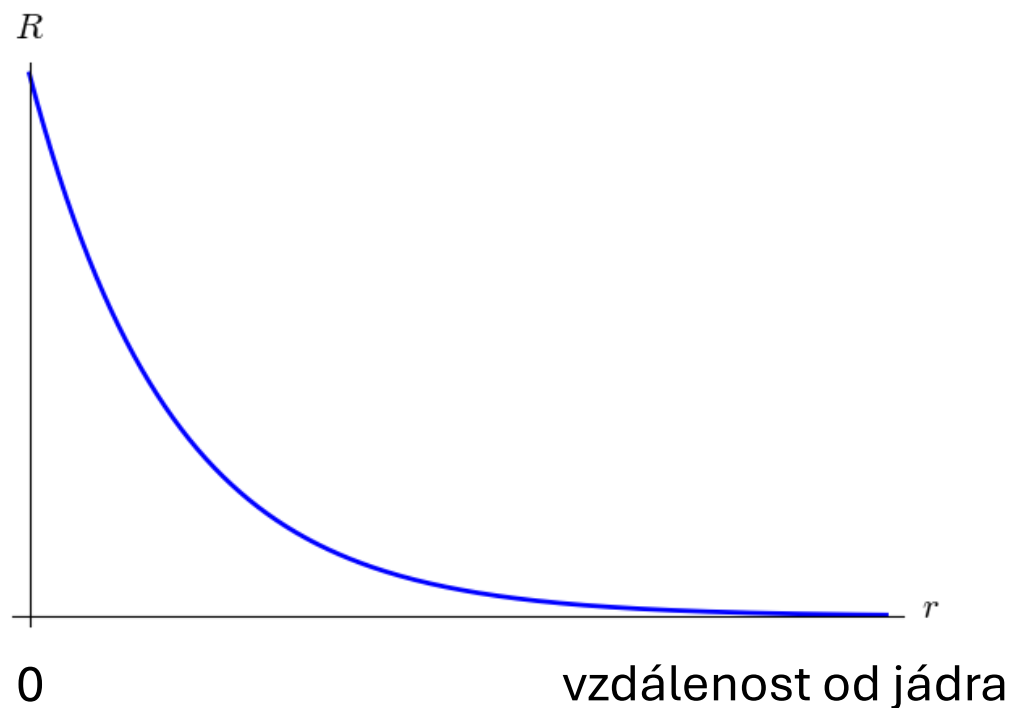


(2) Závislost hustoty pravděpodobnosti na vzdálenosti od jádra

- kartézský graf

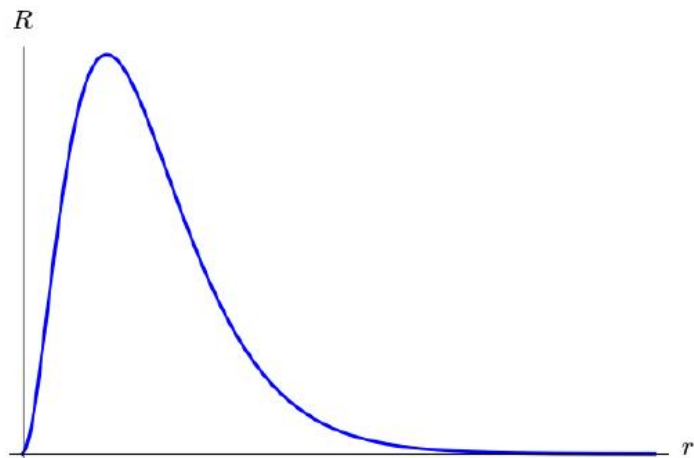
V jaké vzdálenosti od jádra je část hustoty pravděpodobnosti (R) nalezení elektronu **největší**, resp. **nejnižší**?

část hustoty
pravděpodobnosti
závislá na vzdálenosti
od jádra

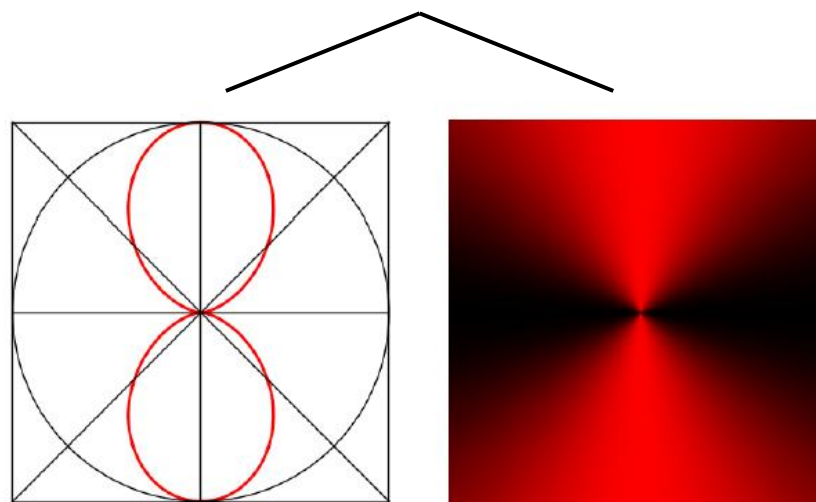


Celková hustota pravděpodobnosti

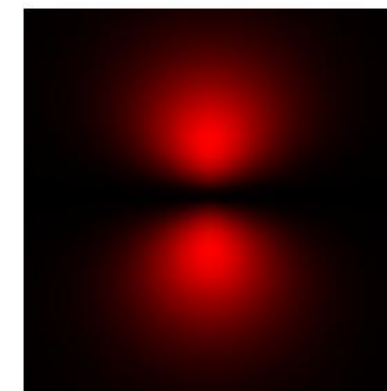
závislost na vzdálenosti



úhlová závislost

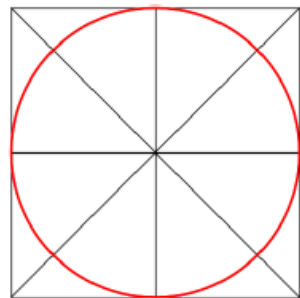
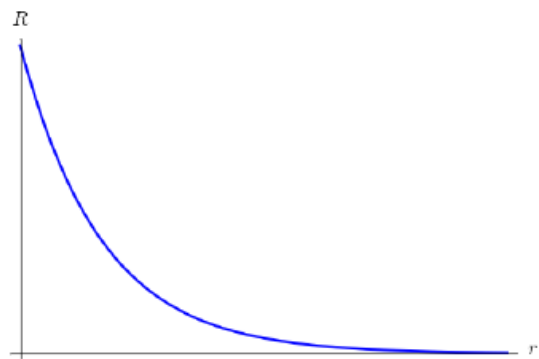


celk. hustota
pravděpodobnosti
= **tvar orbitalu**

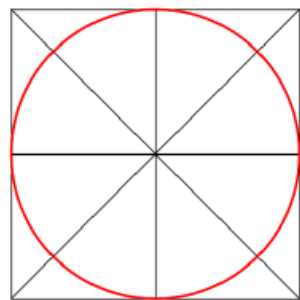
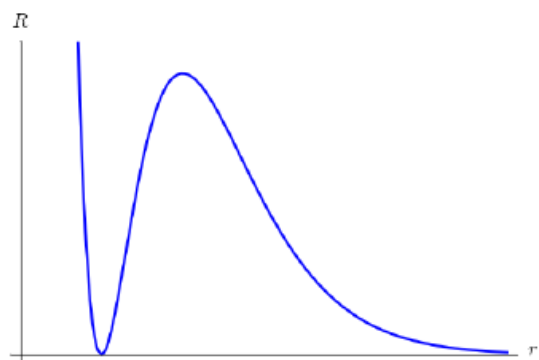


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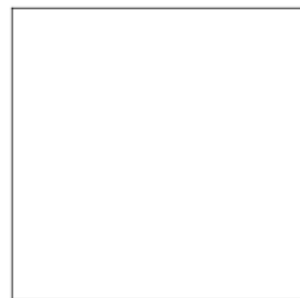
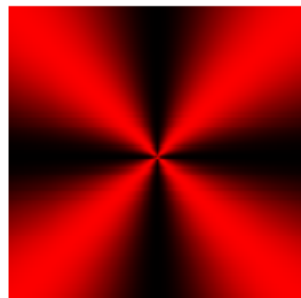
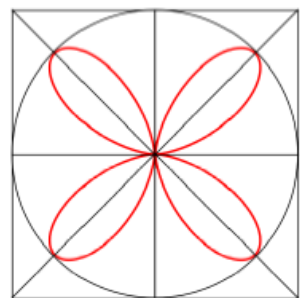
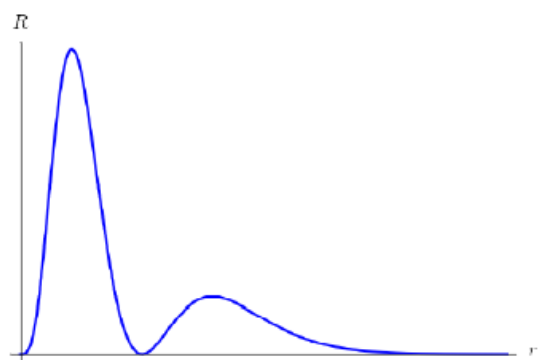
stav 2p



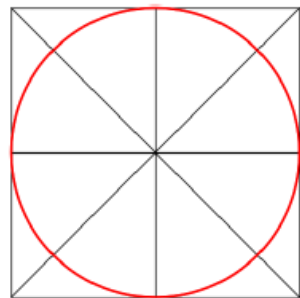
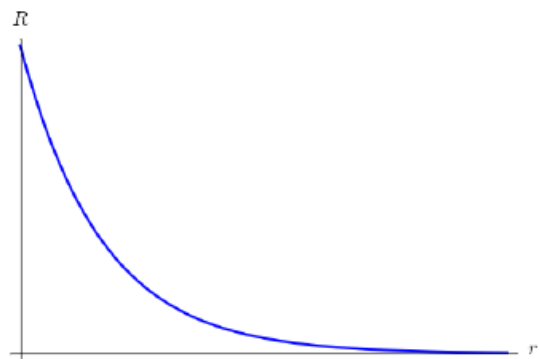
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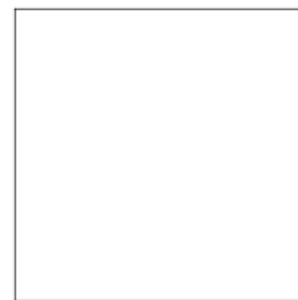
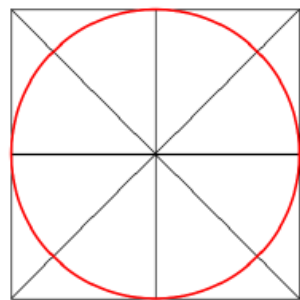
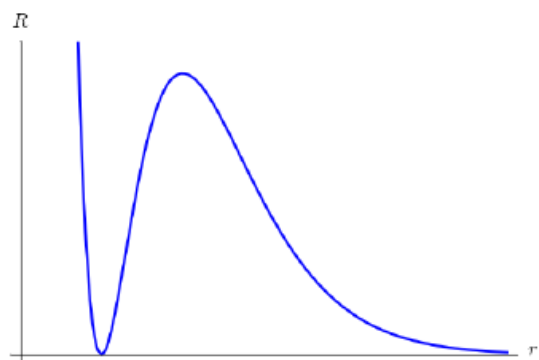
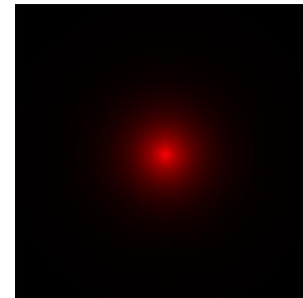
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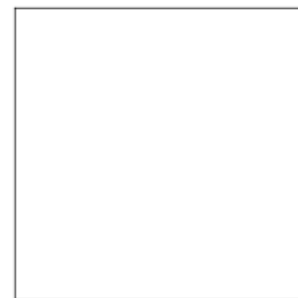
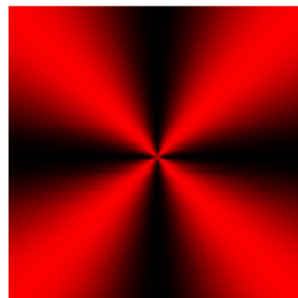
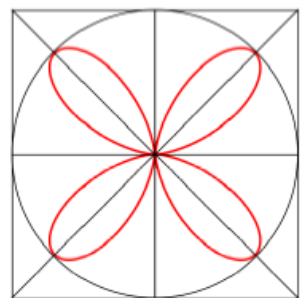
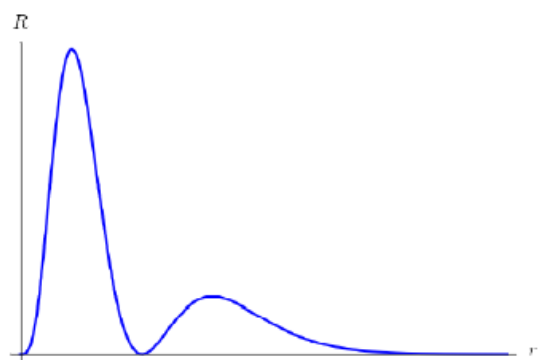
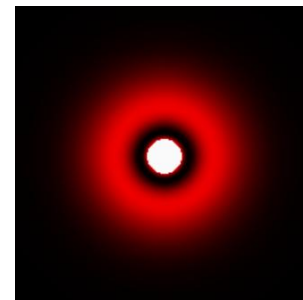
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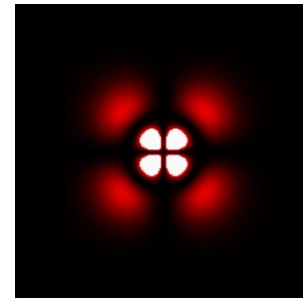
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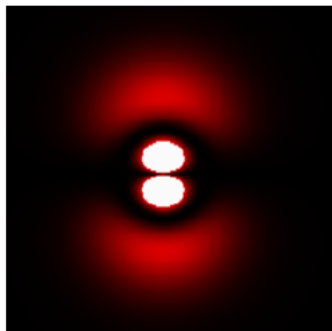


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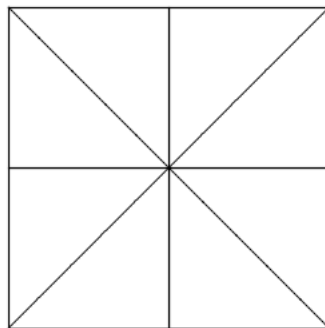
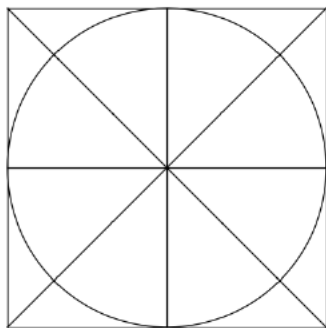


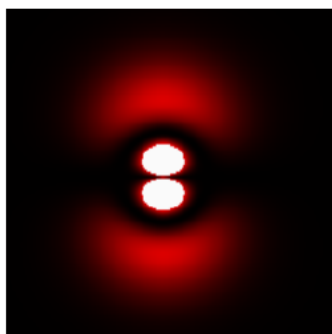
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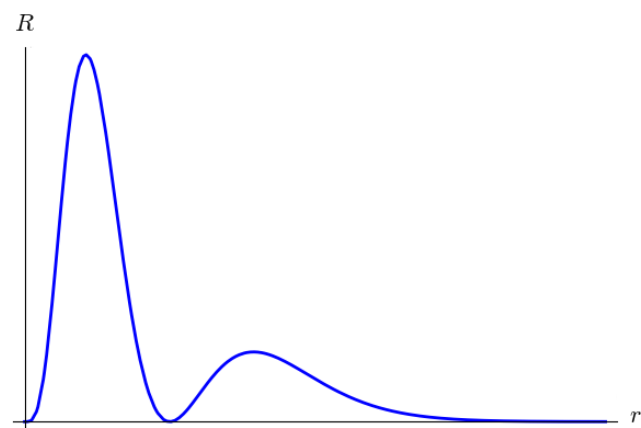
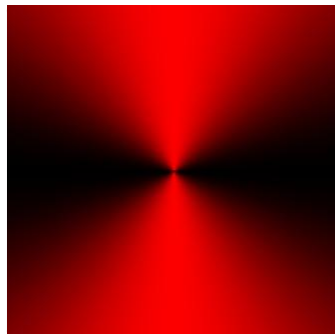
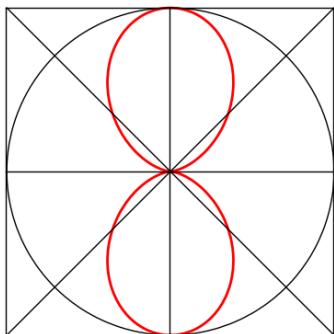


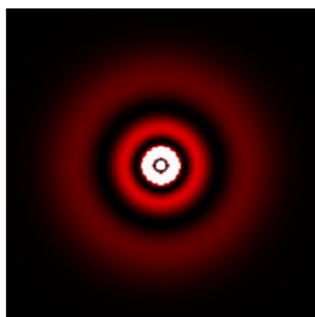
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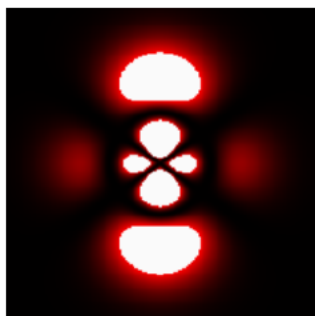
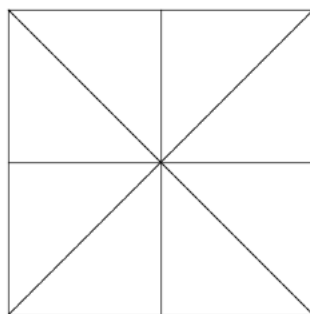
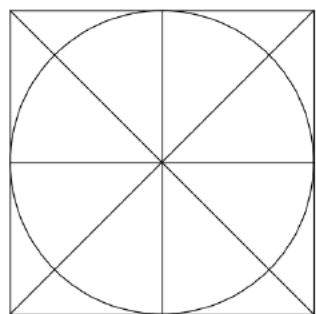


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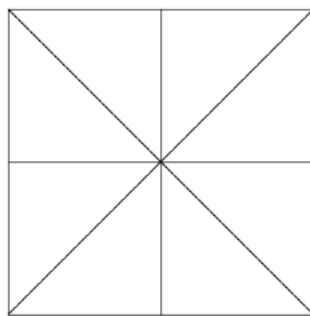
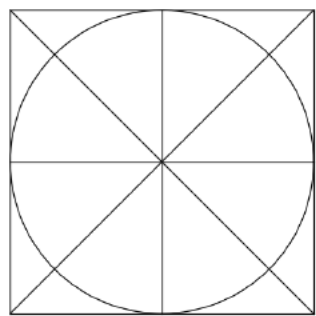


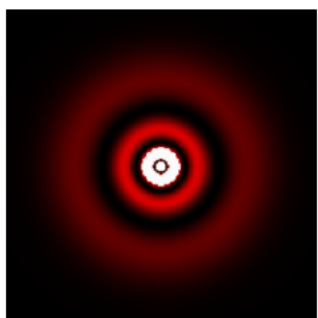


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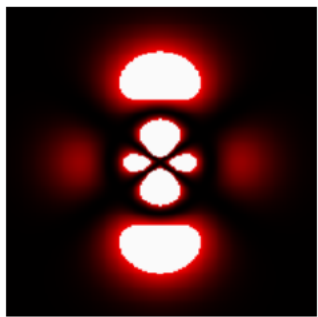
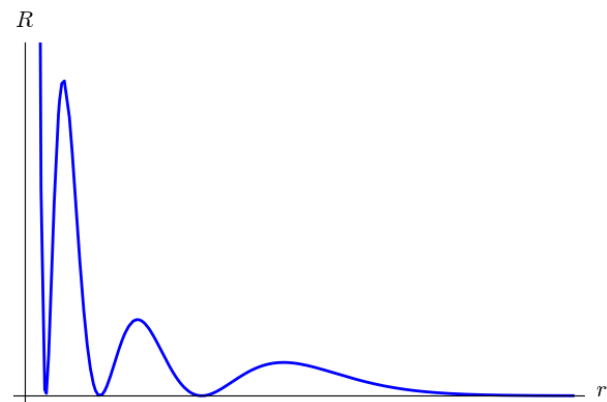
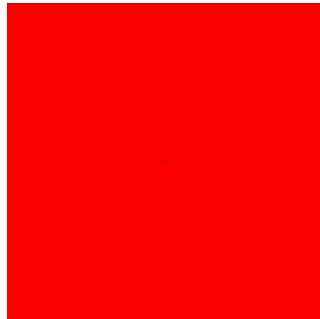
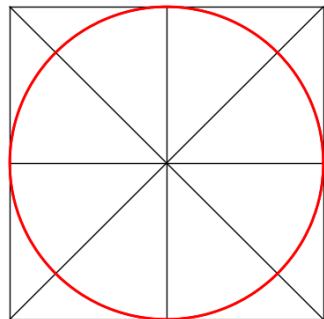


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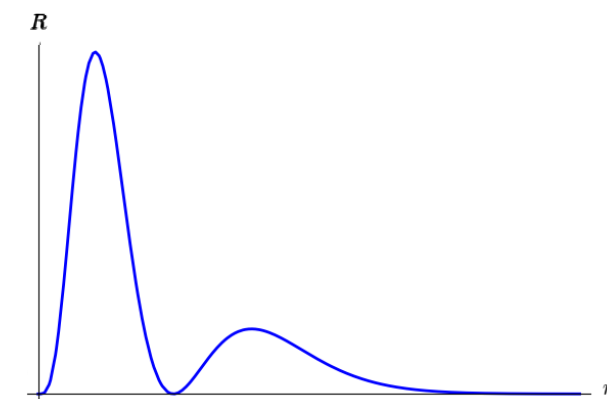
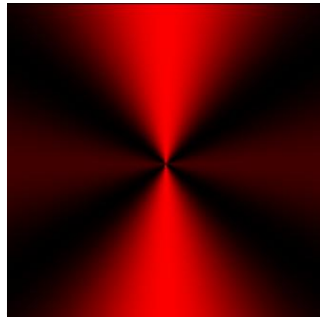
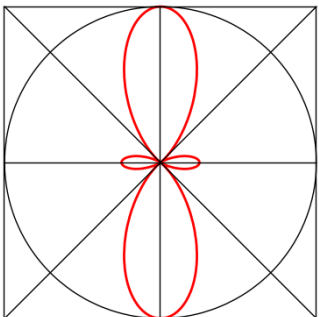


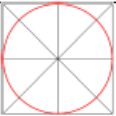
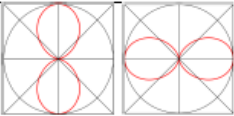
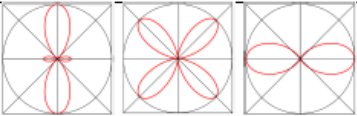
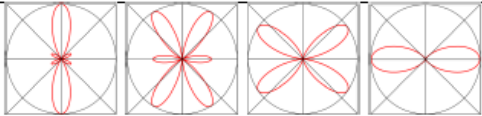
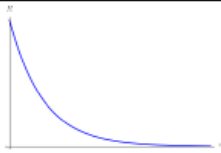
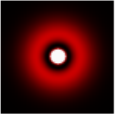
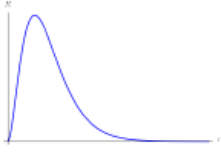
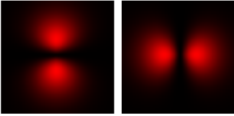
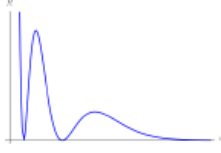
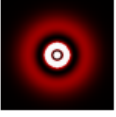
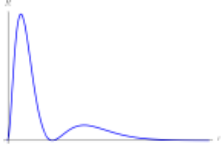
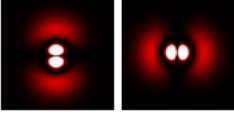
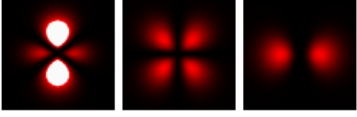
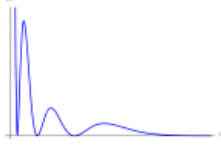
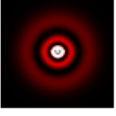
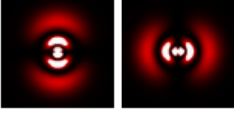
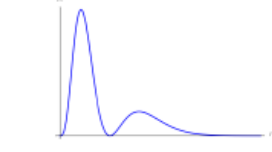
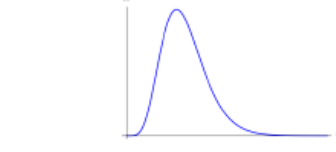
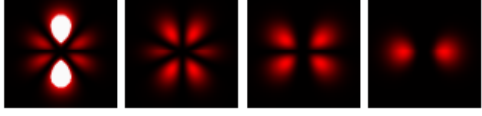


$(4, 0, 0)$



$(4, 2, 0)$



	$l = 0$	$l = 1$	$l = 2$	$l = 3$
	 $m = 0$	 $m = 0$ $m = \pm 1$	 $m = 0$ $m = \pm 1$ $m = \pm 2$	 $m = 0$ $m = \pm 1$ $m = \pm 2$ $m = \pm 3$
$n = 1$	  1s			
$n = 2$	  2s	  2p		
$n = 3$	  3s	  3p	  3d	
$n = 4$	  4s	  4p	  4d	  4f