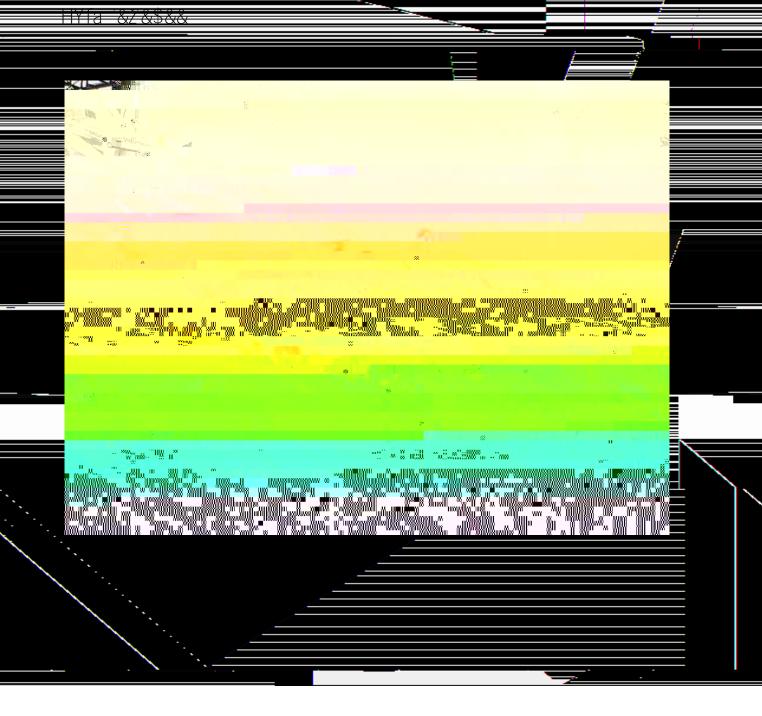
# **ARTS2248**

# 8]gUghYfg`UbX`GcW]Yhm



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# 7 ci fgY<sup>·</sup>Cj Yfj ]Yk

# GHJZZ7cbHJWh78YHJ]`g

#### 7cbj Ybcfg

BUa Y	9a U]`	5j U]`UV]`]m	@cWUh]cb	D∖cbY
A Uf]`i `A Y`c`Ni f]ŀU	<u>a Uf]`i "a Y`c4 i bgk "YXi "Ui</u>		F cca '' *%ž A cfj Yb 6fck b	- ' , ) `&- +\$

#### Hihcfg

BUa Y	9a U]`	5j U]`UV]`]m	@cWUh]cb	D∖cbY
9``Yb`K cb[	<u>\U`4_i bgk "YXi "Ui_</u>			

# GWXcc`7cbHJWh=bZcfaUh]cb

GW&cc``cZ<iaUb]h]Yg7'@Ub[iU[Yg

# 5W\_bck `YX[ Ya YbhcZ7ci bhfm

IBGK `5fhgž8Yg][b`UbX`5fWX]hYWhifY`?Ybg]b[hcb`UbX`DUXX]b[hcb`WUadigYg`UfY`Vi]`hcb`5Vcf][]bU`

# 7ci fgY<sup>·</sup>8YHJ]`g

#### I b]hg cZ7fYX]h\*\*

#### Gi a a UfmcZ'h\Y'7 ci fgY

#### 7cifgY`@YUfb]b[`CihWcaYg

- %" 9I d`U]b`\ck `bUh fU``X]gUghYfgžgcW}YmžXYj Y`cda Ybhdfc[ fUa gžUbX`dc`]WhUfY`]bhYffY`UhYX"
- &" 5ddfUjgY`\_YmUih\cfg`UbX``]hYfUhifY`X]gWigg]b[`X]gUghYfg`Zfca``U`Wf]hJWU``gcWJU``gŴJYbWY`UbX \iaUb]hJYg`dYfgdYWfjiY"
- ' " 5 dd`mYb\UbWYX`YUfb]b[ žUbU`mf]WžUbX`Wca a i b]WUf]cb`g\_]``gž'tc`]bhYfdfYh``]b\_g`VYtk YYb`gcW]Yhm UbX`X]qUqhYfq
- (" 5 bU`mgY`X]gUghYf`WJgY`ghi X]Yg`Zfca Ufci bX`h\Y`k cf`X`k]h`U`fUb[Y`cZX]ZYfYbh'h\YcfYh]WJ` glUbXdc]bhg"

#### HYUW ]b[ GhfUhy[ ]Yg

H\Y'Wei fgY'fYei ]fYg'ghi XYbhg'hc'Yb[U[Y'k]]A WebhYa dcfUfmigeW]c'c[]WU``UbX'\i a Ub]h]Yg'UbU'mh]WU` gW\c`Ufg\]d']b'YI d'cf]b['UbX'UbU'mg]b['h\Y']bhYfgYW]cb'cZX]gUghYfg'UbX'gcW]Ymf''=hk]```fYei ]fY'fYZYW]j Y UbX'gY'ZW]h]WU``YUfb]b['hc[Yh\Yf'k]h`U'WUdUW]mhc'UggYa V`Y'UbX'gmbh\Yg]gY']bZcfa Uh]cb'Zca 'U'fUb[Y'cZ gci fWYg'UbX'X]gW]d`]bUfmVUW\_[ fci bXg''H\Y'Wei fgY'U'gc'k]``fYei ]fY'ghi XYbhg'hc'Udd`mh\YgY']bg][\hg']b'U fYU`'k cfX'X]gUghYf'YI Ua d`Y'UbX'hc'Wea d`YhY'U'a U'cf'd]YWY'cZUggYgga YbhH\UhYI Ua ]bYg'h\Y]f WUdUV]`]h]Yg'hc'Xc'h\]g''H\YgY'cV'YW]j Yg'k]``VY'UW\]Yj YX'h\fci [\`'YWhi fYgž']b!XYdh\'h hcf]U``X]gW gg]cbgž ]bXYdYbXYbhfYgYUfW\'UbX'h\Y'dfYdUfUh]cb'cZUggYgga YbhHUg\_g''=b`cfXYf'Zcf'ghi XYbhg'hc'XYj Y`cd'h\Y Zcfa'g'cZWf]h]WU``fYZYW]cb'bYWfggUfmZcf'h\]g'Wei fgYž'dUfh]W]dUh]cb']b'h hcf]U``X]gW gg]cb'k]``VY Ya d\Ug]gYX'UbX']g'fYZYWhX']b'h\Y'UggYgga YbhgW\YXi 'Y''

H\Y'gi VYWik]```i gY'U'VYbXYX``YUfb]b[`UddfcUW\/k]h\`]bglfi Wijcb`cWW ff]b[`]b'h\Y'WUggfcca `fIYWi fY'UbX h hcf]U`głž'U]XYX'k]h\`cb`]bY'Yb[U[Ya Ybhih\fci [\`Ugg][ba Ybhgž'X]gW gg]cbg`UbX'UWij]]h]Yg"`H\Y'cb`]bY Ybj]fcba Ybhifh\fci [\`a ccX`YŁ`]g'U'bUh fU``YI hYbg]cb`cZlfUX]h]cbU``WUggfcca ``YUfb]b["`5```UggYgga Ybhg



# FYgci fWfg

# DfYgWf]VYX`F Ygci fWfg

 $\label{eq:final_states} F \ Y U X ] b [ \ g^{\cdot} Z c \ f^{\cdot} h \ Y \ W c i \ fg Y \ k \ ]^{\cdot \cdot \cdot} V Y \ U W W gg Y X \ h \ fc i \ [ \ \ @Y [ \ U b h c \ ]^{\cdot \cdot} e Y [ \ U b$ 

# FYWca a YbXYX<sup>°</sup>FYgci fWfg

6cc\_g

7 ci fgYgʻUfYʻdYf]cX]WU``mfYj ]Yk YXžUbXʻgh XYbhgʻZYYXVUW\_`]gʻi gYXʻhcʻ]a dfcj Yʻh\Ya "`: YYXVUW\_`]g

# Gi Va ]gg]cb cZ5ggYgga YbhHUg\_g

# Hi fb]h]b Gi Va ]gg]cb

Zmci YbWci bhYf'U'dfcV'Ya 'k \Yb'UhYa dhjb[ 'hc'gi Va ]hmci f'Ugg][ ba YbhN fci [ \ 'Hi fb]hjbžd'YUgY hY'Yd\cbY'9I hYfbU'`Gi ddcfhcb'-', ) '' ' '%cf'Ya U]`'h\Ya 'cb'YI hYfbU'hY'hgi ddcfh4 i bgk "YXi "Ui '"'Gi ddcfh \ci fg'UfY', .\$\$Ua '-'%\$.\$\$da 'cb'k YY\_XUmg'UbX'-.\$\$Ua '-') .\$\$da 'cb'k YY\_YbXg'fl \*) 'XUmg'U'mYUfŁ'' Zmci UfY'i bUV'Y'hc'gi Va ]hmci f'Ugg][ ba YbhXi Y'hc'U'ZJi `hk ]h\'Hi fb]hjb'mci 'a UmUdd`mZcf'Ub'YI hYbg]cbžVi hmci a i ghfYhU]b'mci f'hjW\_Yhbi a VYf'Zfca '9I hYfbU'`Gi ddcfhfU'cb[ 'k ]h\ 'Ubmch\Yf'fY'Yj UbhXcW a YbhgŁhc ]bWi XY'Ug'Yj ]XYbWY hc'gi ddcfhmci f'YI hYbg]cb'Udd`]WUh]cb'' Zmci 'Ya U]`'9I hYfbU'`Gi ddcfhimci 'k ]`` Ui hca UhjWU'`mfYWY]j Y'U'hjW\_Yhbi a VYfžVi h]Zmci 'hY`Yd\cbY'mci 'k ]``bYYX'hc'gdYWJZWU``mUg\_'Zcf'cbY" Hi fb]hjb'U`gc'dfcj ]XYg'i dXUhYg'cb'h\Y]f'gmghYa 'gfUh'g'cb'Hk ]hYf"

; YbYfU``mž'UggYgga YbhHUg\_g`a i ghVY`gi Va ]HYX`Y`YWfcb]WU``mj ]U`Y]H\Yf`Hi fb]h]b`cf`U`A ccX`Y Ugg][ ba YbH'`=b`]bgHUbWfg`k \YfY`H\]g`]g`bchdcgg]V`Yž`]hk ]```VY`gHUHYX`cb`mci f`Wci fgY**'**g`A ccX`Y`g]HY`k ]H\ U`HYfbUh]j Y`gi Va ]gg]cb`XYHU]`g"

: cf`]bZcfa Uh]cb`cb`\ck `hc`gi Va ]hUgg][ ba Ybhg`cb`]bY`j ]U`A ccX`Y.`\hhdg.##gh XYbh'i bgk "YXi "Ui #\ck! gi Va ]hUgg][ ba Ybha ccX`Y

# 5WUXYa ]W<cbYghmUbX D`U[ ]Uf]ga

D`U[]Uf]ga `]g`i g]b[`h\Y`k cfXg`cf`]XYUg`cZch\Yfg`UbX`dfYgYbh]b[`h\Ya `Ug`mci f`ck b"`+h\WUb`hU\_Y`a Ubm Zcfa gžZfca `XY`]VYfUhY`V\XYUh]b[`hc`UVW]XYbhU``mWcdm]b[`Zfca `U`gci fWY`k]h\ci hUW\_bck `YX[Ya Ybh'

### 5WUXYa]W=bZcfaUh]cb

8i Y'hc'Yj c'j ]b['UXj ]WY'VmBGK '<YU'h\žighi XYbhg'a i gh'W\YW\_'Zcf'i dXUhYX']bZcfa Uh]cb'fY[UfX]b['cb`]bY 'YUfb]b['Zcf'U``5fhgž'8Yg][b'UbX'5fW\]hYWhi fY'Wci fgYg'h\]g'hYfa 'fj ]U'A ccX`Y'cf'Wci fgY']bZcfa Uh]cb dfcj ]XYX"Ł

: cf<sup>\*</sup>YggYbhJU<sup>\*\*</sup>gh XYbh<sup>\*</sup>]bZcfa UhJcb<sup>\*</sup>fY<sup>\*</sup>UhJb[<sup>\*\*</sup>hc.

- fYei Yghg Zcf Yl hYbg]cb/
- `UhY`gi Va ]gg]cbg`[ i ]XY`]bYg/
- fYj ]Yk 'cZa Uf\_g/
- I BGK '<YU`h\`UbX'GUZYhmidc`]WjYg/