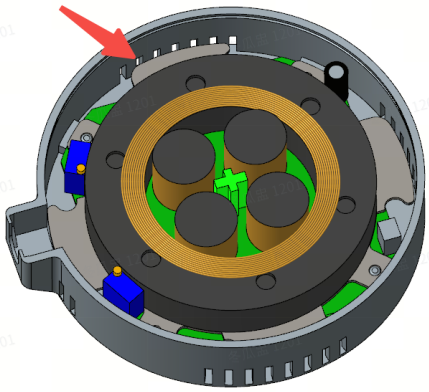
磁悬浮机芯创作指南 Magnetic Levitation DIY Kit Design Guidelines

ENG:

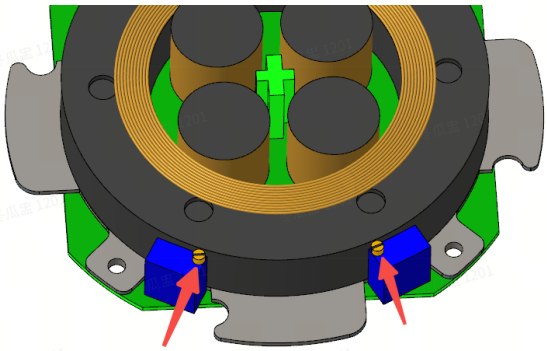
1. magnetic levitation base shell

1. The magnetic levitation base generates heat during operation. Excessive heat will cause the magnetic levitation base to enter overheat protection and be unable to maintain continuous suspension. Therefore, for any enclosure design with shielding on all sides, corresponding heat dissipation holes should be provided.



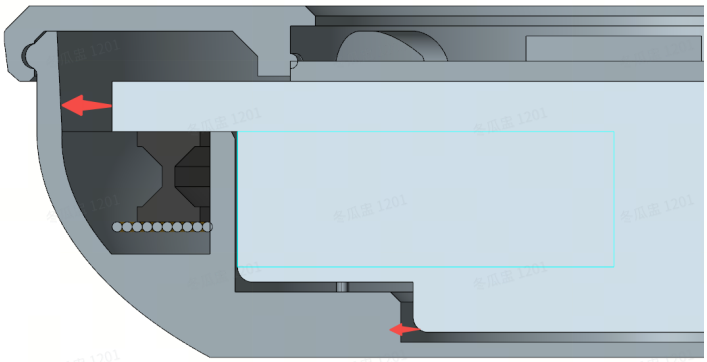
2. The large iron pieces surrounding the magnetic levitation base are heat sinks. The temperature is relatively high and may lead to filament softening. It is not recommended for printed parts to be in direct contact with them.
3. If screws are needed to install the magnetic levitation base, non-magnetic screws such as 316/nylon should be used to prevent interference with the magnetic levitation base.
4. The pins of the power interface of the magnetic levitation base are relatively long. When designing, attention should be paid to the distance between the pins and the magnetic levitation base, and sufficient space should be reserved during and after installation.
5. When installing the power interface, it is recommended to first carefully remove it from the magnetic levitation base. Then install it on the side wall and reinstall it on the magnetic levitation base to prevent excessive twisting of the power cord.

6. The touch switch on the magnetic levitation base is used to control the float light. The plane without components should be attached to a plane with a thickness of no more than 3mm. Exceeding this thickness may result in insensitive switching. Glue, ordinary double-sided tape, and Maker's Supply's double sided foam tape can all be used for fixation. At the same time, it is recommended to draw marks on both sides of the installation plane to facilitate finding the switch.
7. If it is necessary to open the original protective case, operate with caution. Do not adjust the blue potentiometer knob on the magnetic levitation base, as this will interfere with the sensor and cause the magnetic levitation base to fail to work properly.

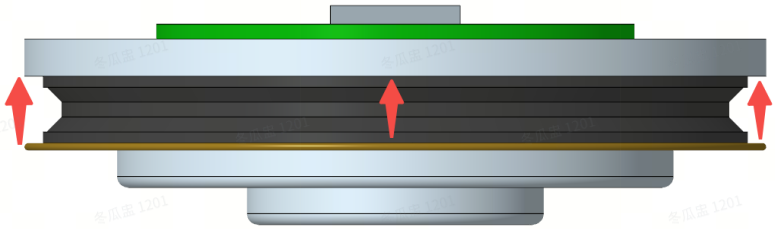


2. Floating Object

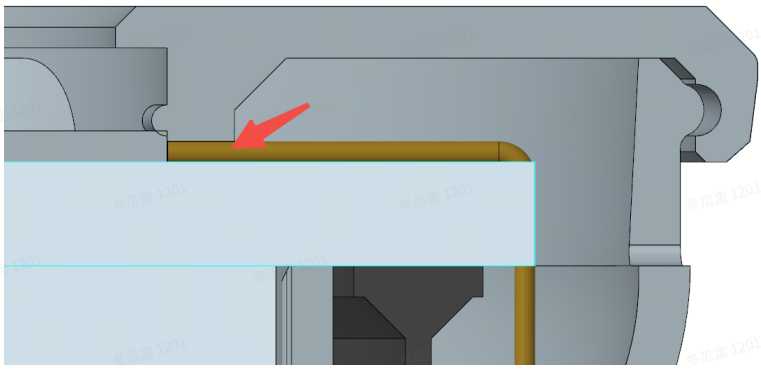
1. The magnetic levitation float is assembled from multiple magnets. When designing, it is recommended to reserve a gap of about 1mm in diameter for other sections except the fixed section to prevent interference.



2. To prevent the float from being damaged when dropped, the lower part of the float installation shell should completely enclose the float.
3. The power supply coil of the float light board needs to be at least 4mm away from the top level of the float to obtain sufficient power. Being too close to the float or too far from the base will affect the brightness of the light.



4. The coil connection wire is relatively thin. It is recommended to reserve a height gap of at least 0.4mm to prevent the coil connection wire from being pressed and broken.



5. The components on the light board are relatively close to the edge of the PCB board. Please pay attention to the risk of interference between parts and components.
6. The load capacity of the module is about 80g (without float). The lower the centre of gravity of the model, the more stable the model can be placed and the load capacity of the kit can be increased.

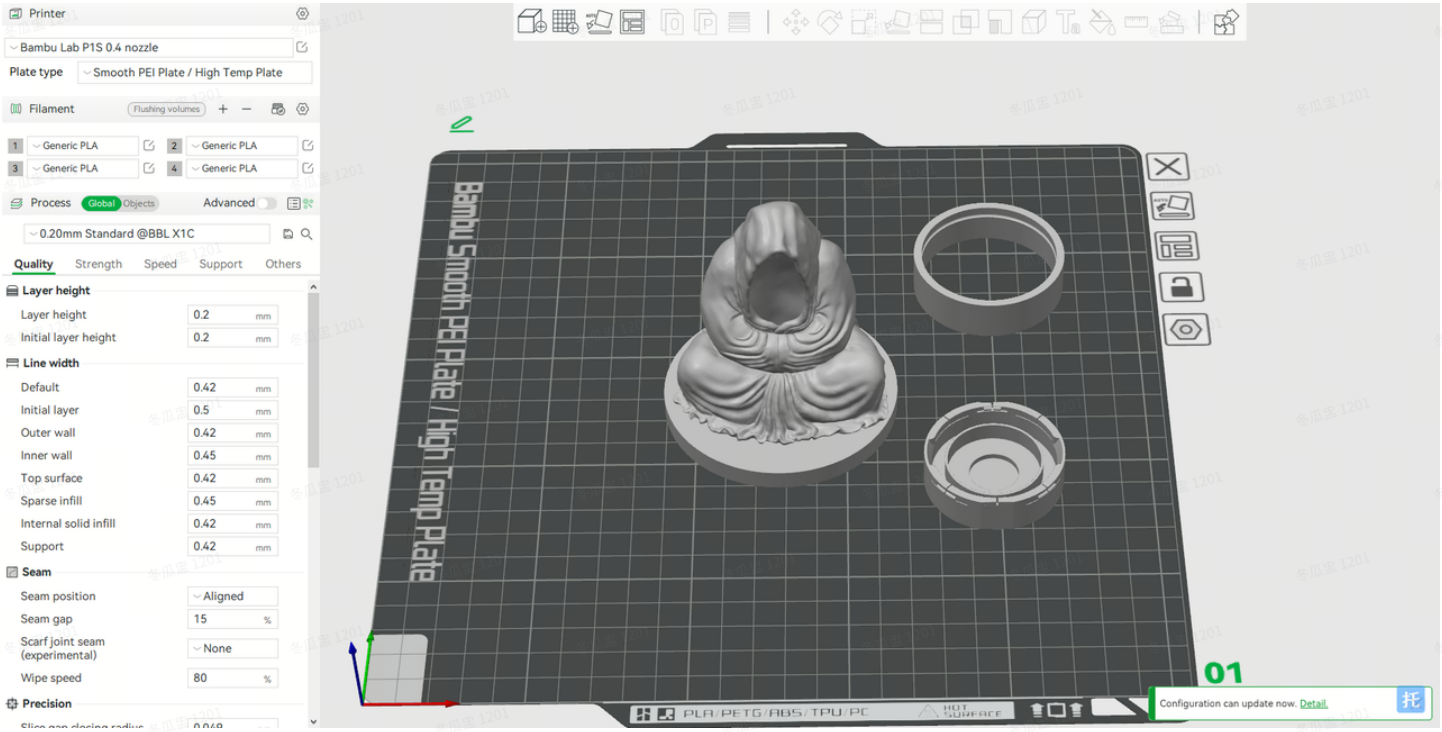
3. Auxiliary Tool

For the user, a proper auxiliary tool can be extremely helpful in placing the model! It is highly recommended that creators who wish to share their models with the community should create a tool that corresponds to the model and helps the user to find the centre of the base and put the model down vertically. the tool in the 3D file is an example, and the Levitation Pyramid of Time Fragments by @flowercat also shows a good one.

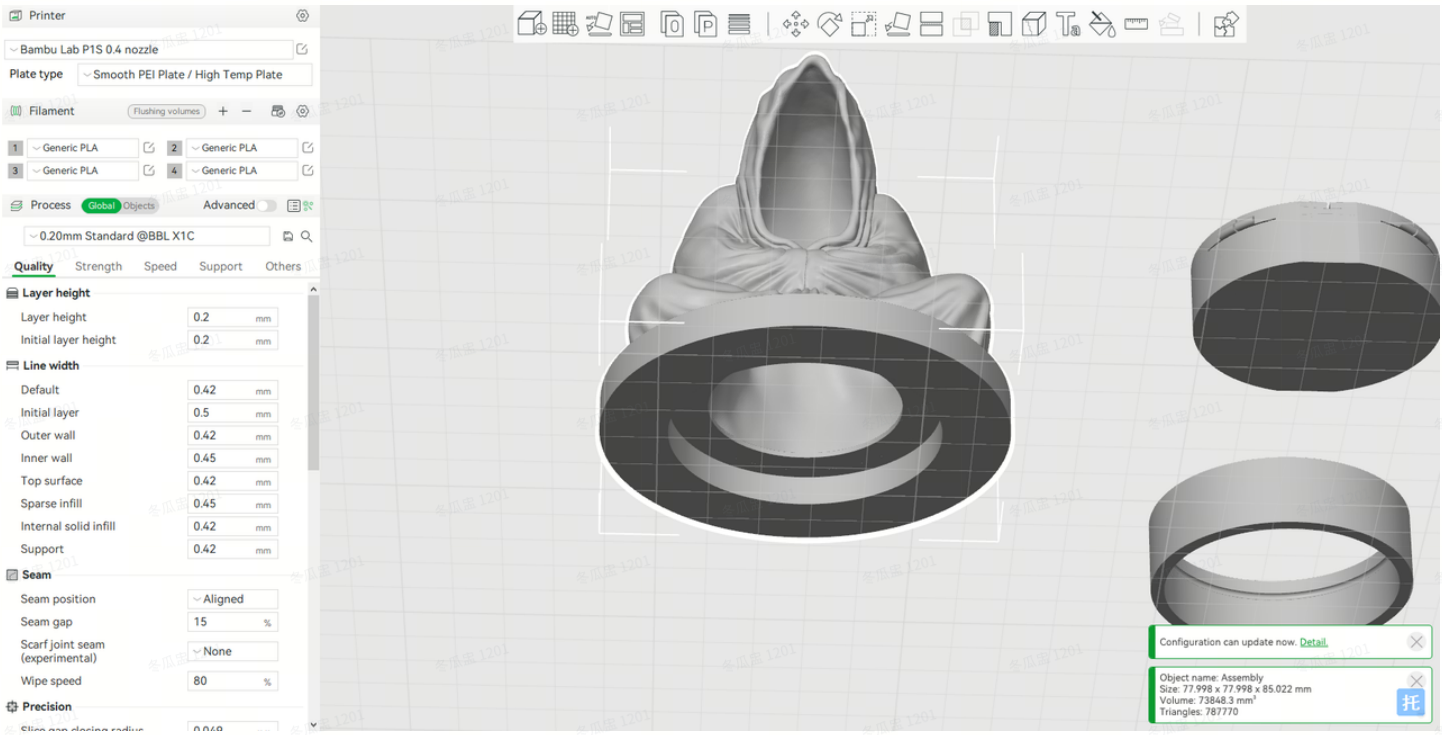
4. Create floating models with the Model DIY Boolean tool in 3D Model.

Want to make a model fly? Follow the steps below to combine a model with a float to keep it afloat. The following Meditating Reaper LED Candle Holder from ONI.FORGE is an example.

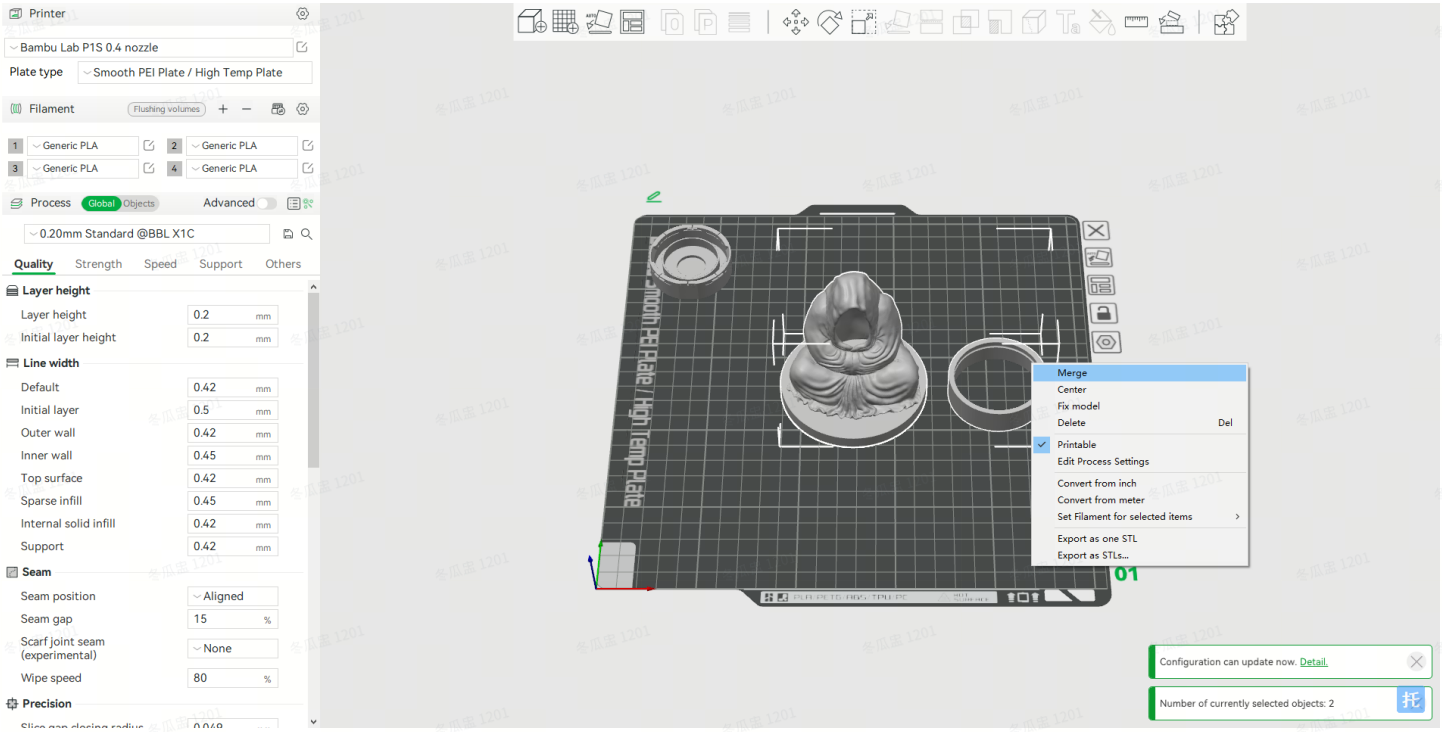
1. Open the model you want to modify and import the base and lid from the Model DIY Boolean tool



2. Adjust the size of the model and dig a 52mm diameter and 6 to 18mm deep slot into it. This depth will determine the position of the model relative to the float and the height of levitation. Exceeding this range will result in the bottom of the model contacting the base and failing to levitate. The recommended float height is 14.6mm if conditions permit.



3. Combine the model base from the Boolean tool with the model, then use the assembly function to select and align the two faces


Printer
Bambu Lab P1S 0.4 nozzle
Plate type
Smooth PEI Plate / High Temp Plate
Filament
Flushing volumes
Generic PLA
Process
Global
Objects
Advanced
0.20mm Standard @BBL X1C
Quality
Strength
Speed
Support
Others
Layer height
Layer height 0.2 mm
Initial layer height 0.2 mm
Line width
Default 0.42 mm
Initial layer 0.5 mm
Outer wall 0.42 mm
Inner wall 0.45 mm
Top surface 0.42 mm
Sparse infill 0.45 mm
Internal solid infill 0.42 mm
Support 0.42 mm
Seam
Seam position Aligned
Seam gap 15 %
Scarf joint seam (experimental) None
Wipe speed 80 %
Precision
Merge
Center
Fix model
Delete Del
Printable
Edit Process Settings
Convert from inch
Convert from meter
Set Filament for selected items
Export as one STL
Export as STLs...
Smooth PEI Plate / High Temp Plate
01
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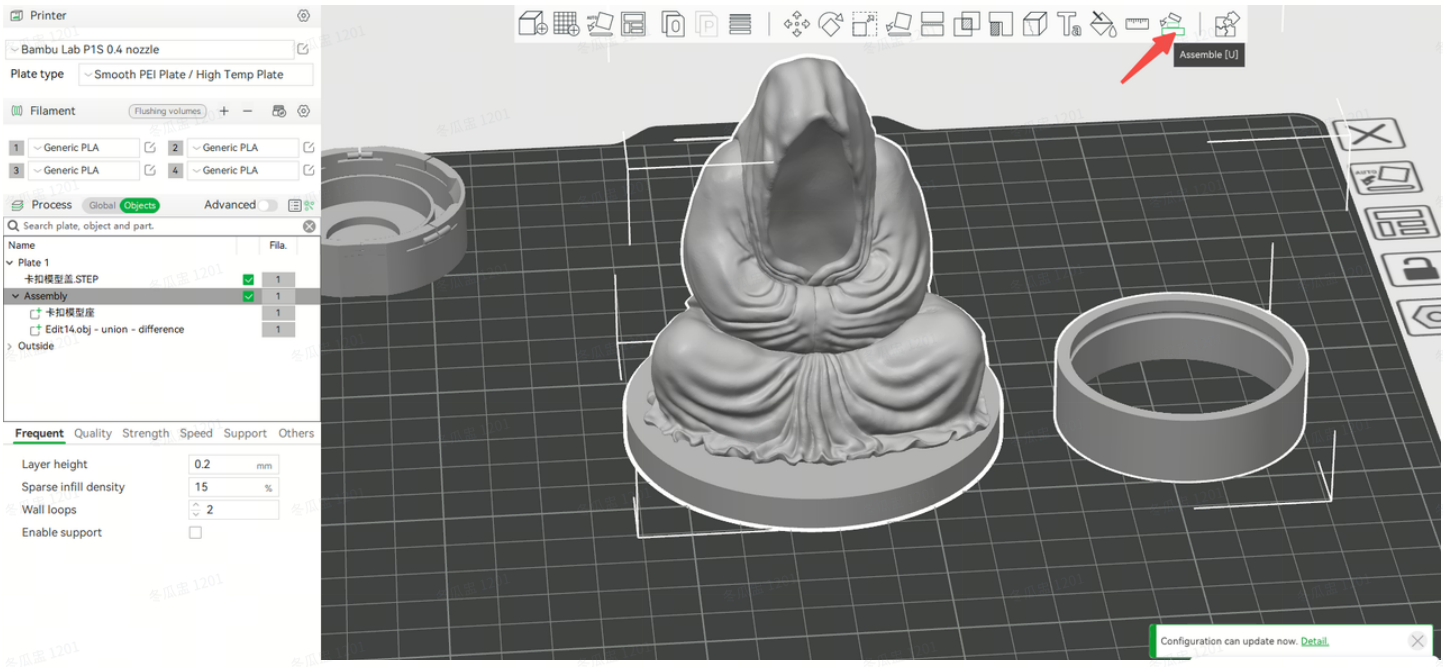
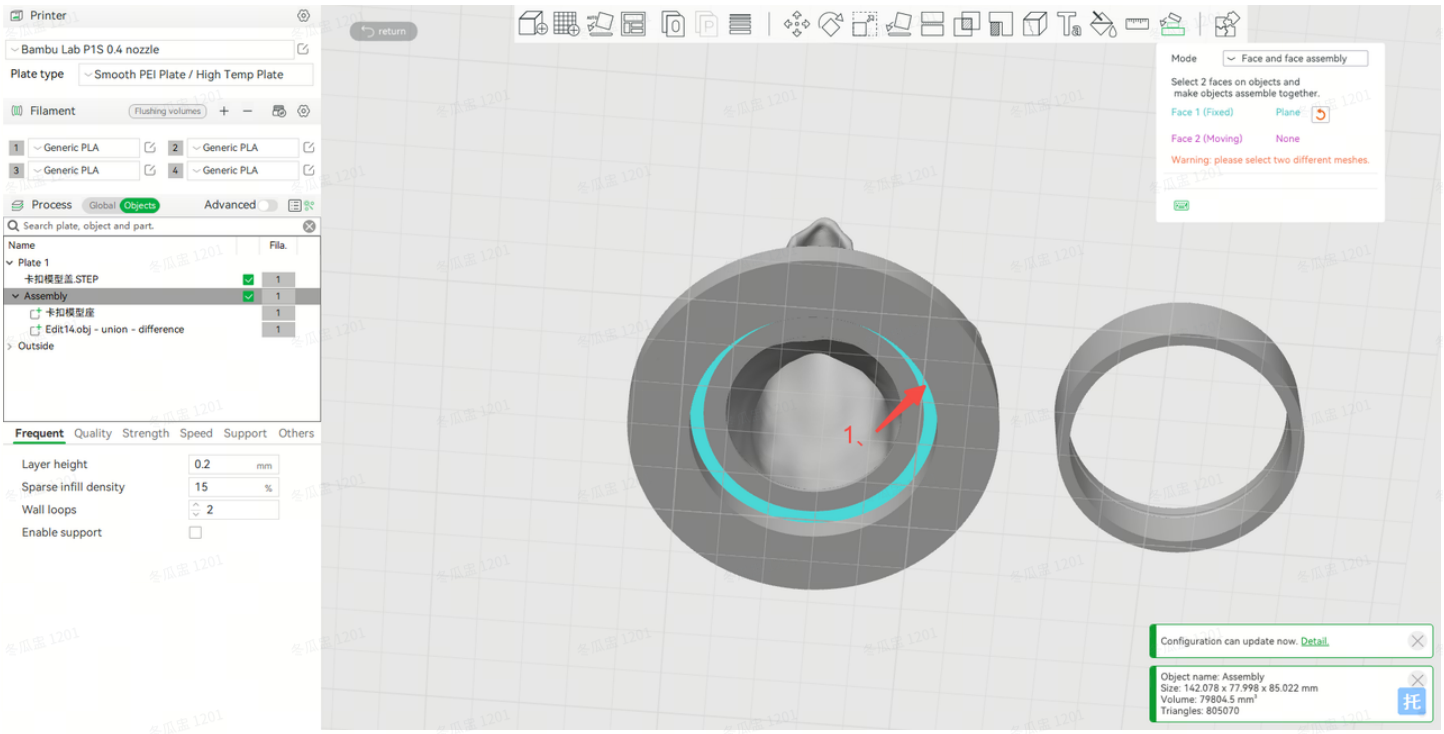
Number of currently selected objects: 2


Printer
Bambu Lab P1S 0.4 nozzle
Plate type
Smooth PEI Plate / High Temp Plate
Filament
Flushing volumes
Generic PLA
Process
Global
Objects
Advanced
Search plate, object and part.
Name
Fila.
Plate 1
卡扣模型盖.STEP
Assembly
卡扣模型座
Edit14.obj - union - difference
Outside
Frequent
Quality
Strength
Speed
Support
Others
Layer height 0.2 mm
Sparse infill density 15 %
Wall loops 2
Enable support
Assemble [U]
Configuration can update now. Detail.


Printer
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Filament
Generic PLA
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Name
Plate 1
卡扣模型盖.STEP
Assembly
卡扣模型座
Edit14.obj - union - difference
Outside
Frequent
Quality
Strength
Speed
Support
Others
Layer height
0.2
Sparse infill density
15
Wall loops
2
Enable support
Mode
Face and face assembly
Select 2 faces on objects and make objects assemble together.
Face 1 (Fixed)
Plane
Face 2 (Moving)
None
Warning: please select two different meshes.
1、
Configuration can update now. Detail.
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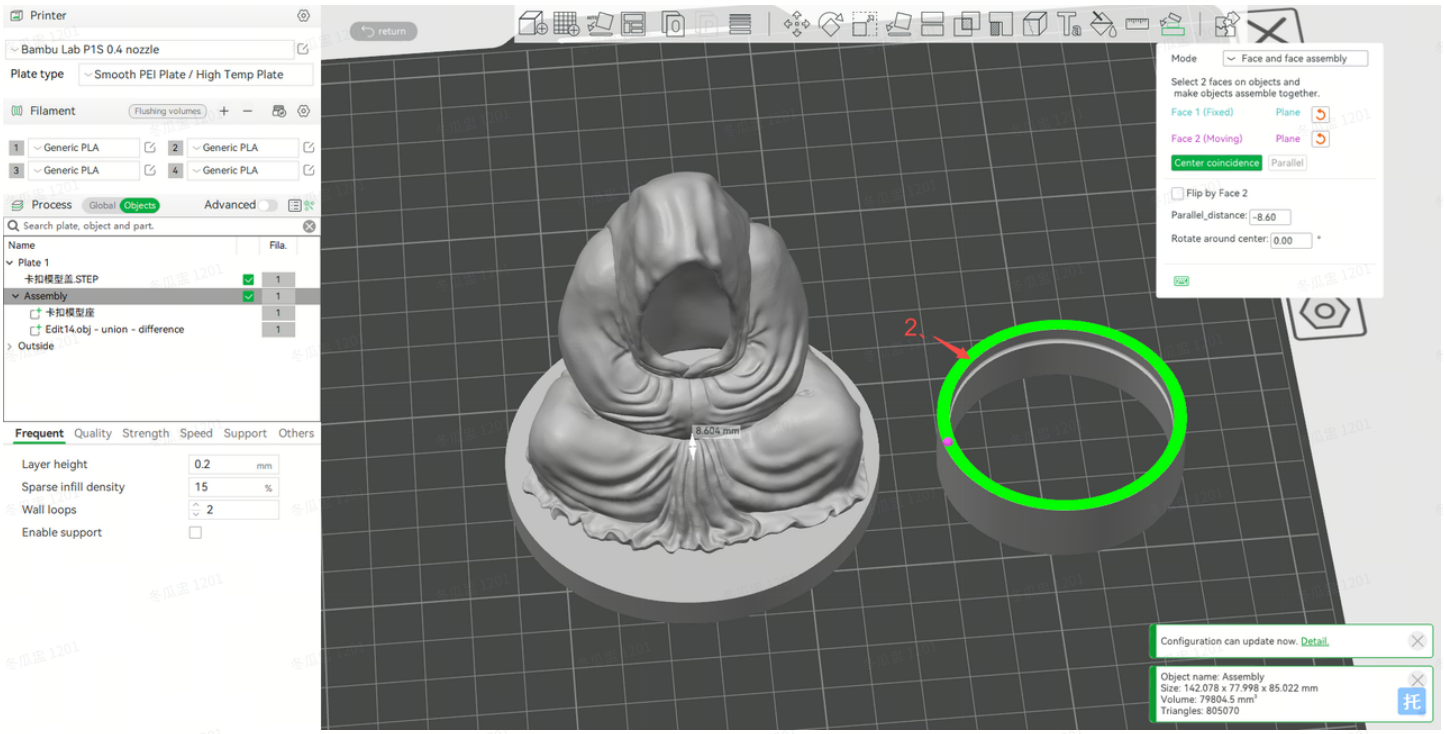
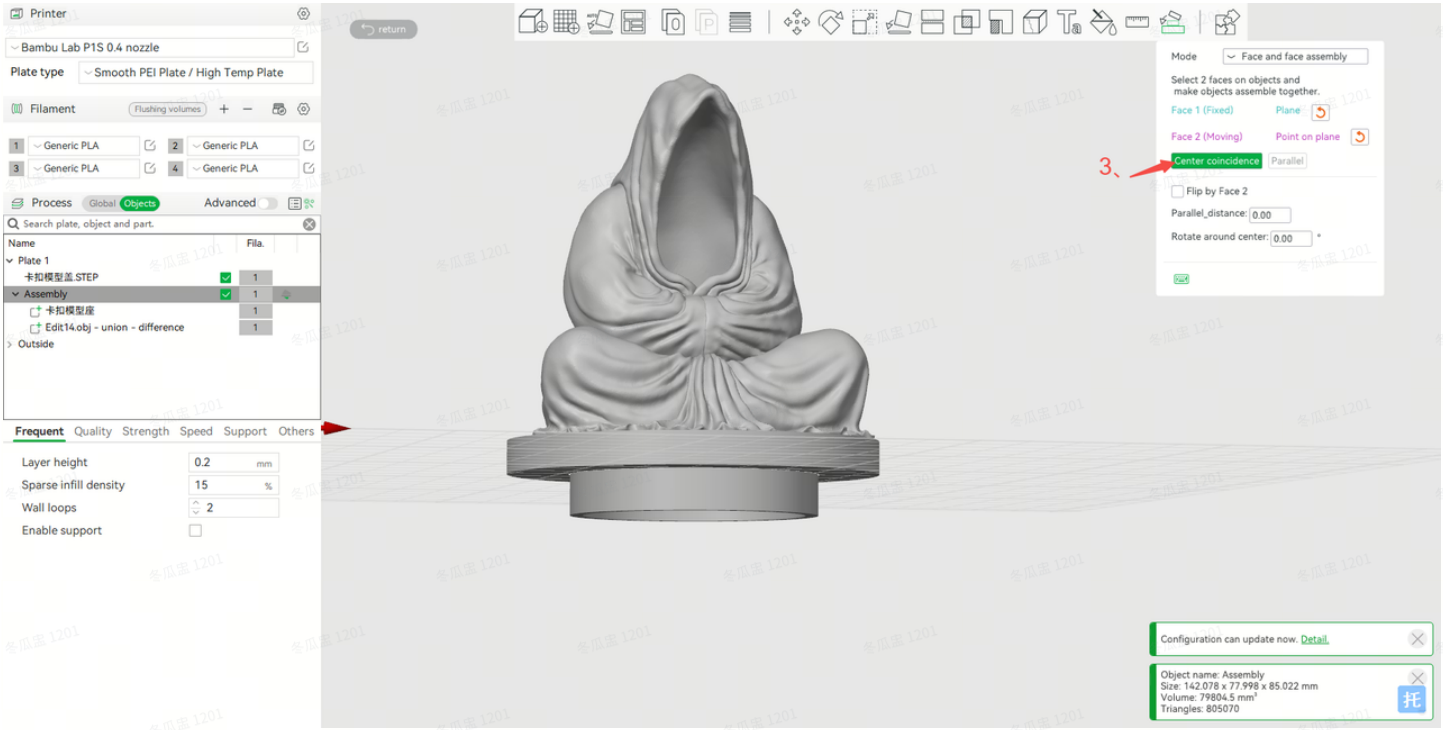
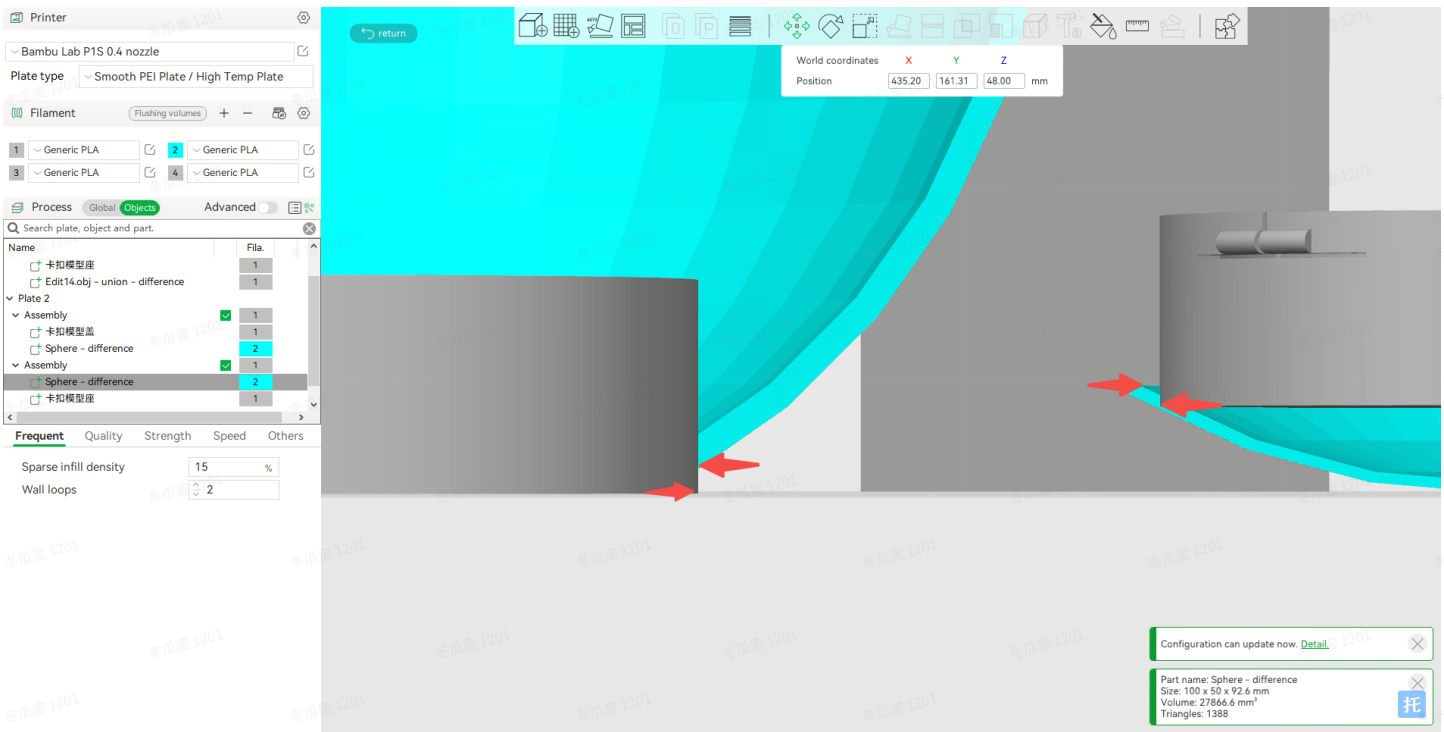
Size: 142.078 x 77.998 x 85.022 mm
Volume: 79804.5 mm³
Triangles: 805070


Printer
Bambu Lab P1S 0.4 nozzle
Plate type
Smooth PEI Plate / High Temp Plate
Filament
Generic PLA
Process
Advanced
Name
Plate 1
卡扣模型盖.STEP
Assembly
卡扣模型座
Edit14.obj - union - difference
Outside
Frequent
Quality
Strength
Speed
Support
Others
Layer height
0.2
Sparse infill density
15
Wall loops
2
Enable support
Mode
Face and face assembly
Select 2 faces on objects and make objects assemble together.
Face 1 (Fixed)
Plane
Face 2 (Moving)
Plane
Center coincidence
Parallel
Flip by Face 2
Parallel_distance:
-8.60
Rotate around center:
0.00
2、
8.604 mm
Configuration can update now. Detail.
Object name: Assembly
Size: 142.078 x 77.998 x 85.022 mm
Volume: 79804.5 mm³
Triangles: 805070



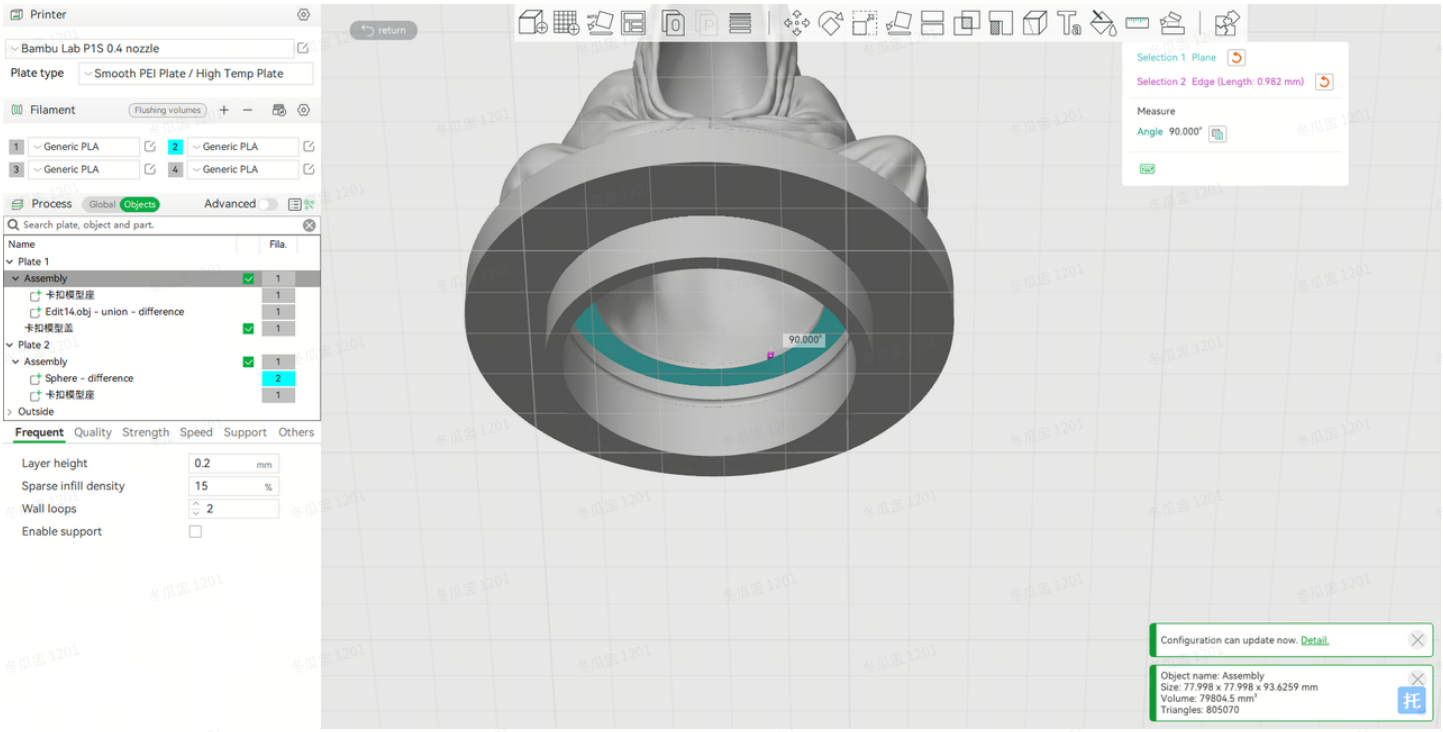
4. For models that still have features on the lower part of the model cap (e.g. spheres), the model cap needs to be combined with the lower model. Note the alignment of the upper and lower model angles and heights! The model cap in the Boolean tool should be aligned with the height of the model seat.

As shown in the figure, in order to combine the float cap with the lower part of the model, it needs to be lowered a distance, while the upper model has to be raised the same distance to align the heights.

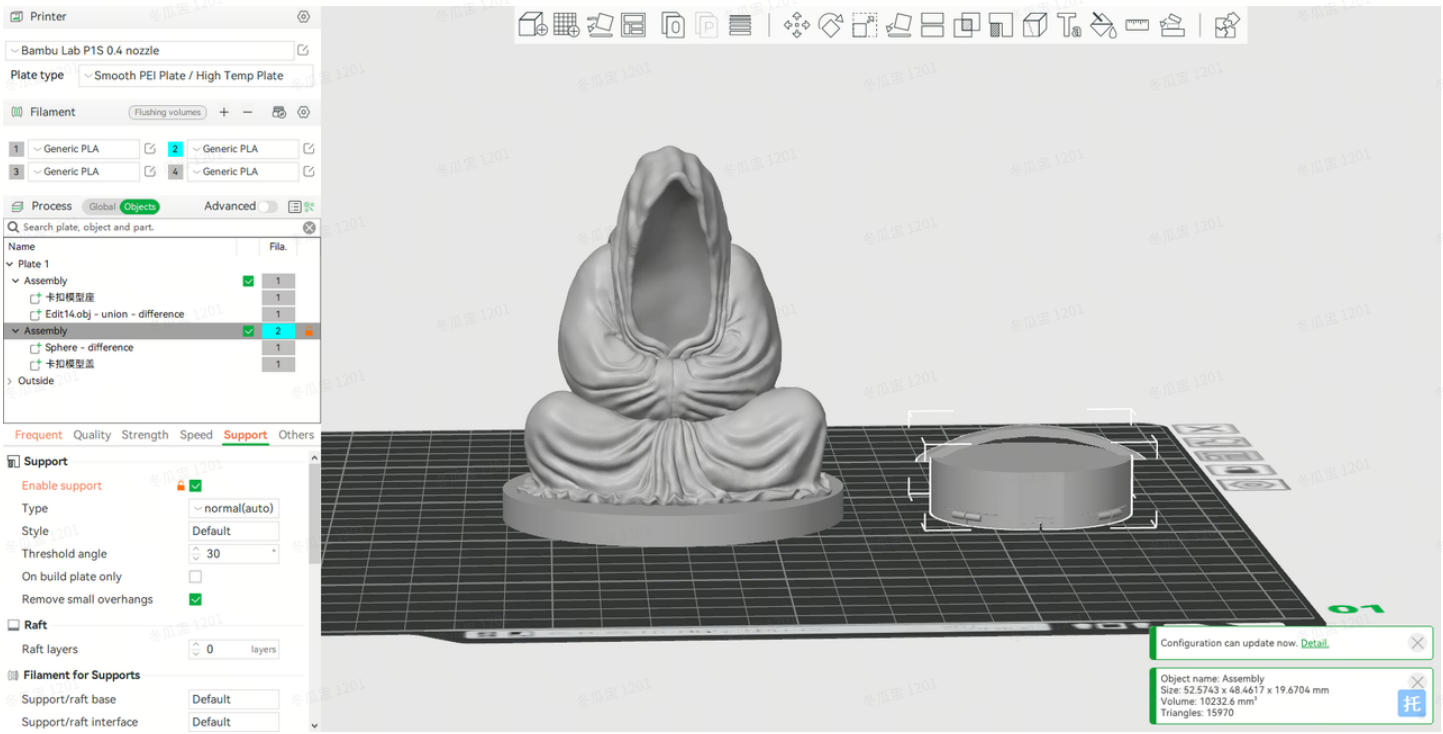


5. The lower model can be used as a limit between the float cap and the model seat. For those models which do not have a lower part, the upper part of the model needs to be closed.

A disc with an outer diameter of 52mm, an inner diameter of 37mm and a thickness of 1mm can be used to join the upper part of the model cap.

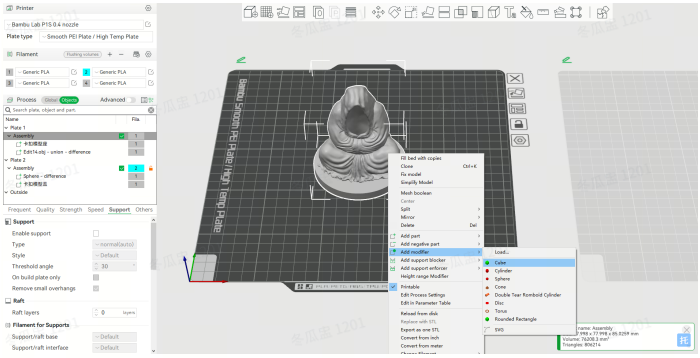


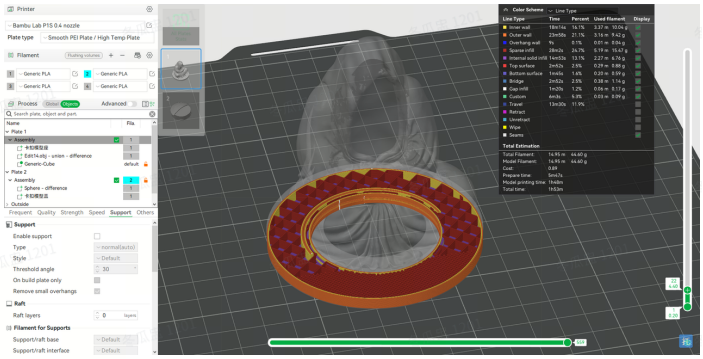
6. Remove the excess part. For models with a lower section, reverse the model cap and lower section and add support.



6、Print, embed the float cap in the model base and enjoy!

EX: To adjust the centre of gravity of a model, you can add modifiers to the light side and increase the fill density. This method only works for models with some solid space.

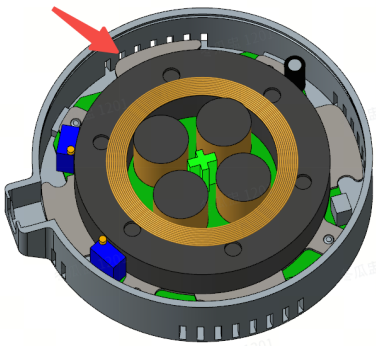




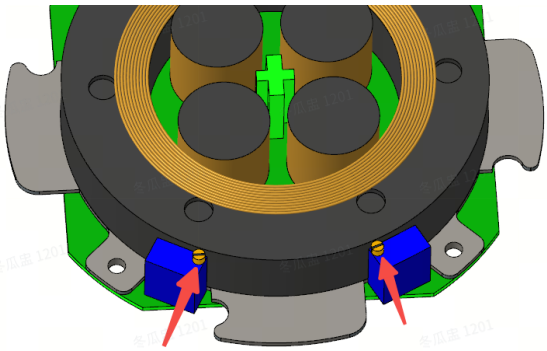
中文版：

1. 机芯外壳注意事项

1. 机芯在运作过程中会发热，过热将会导致机芯进入过热保护而无法持续悬浮，因此建议任何四周有遮蔽的外壳设计都应该留出相应的散热孔。



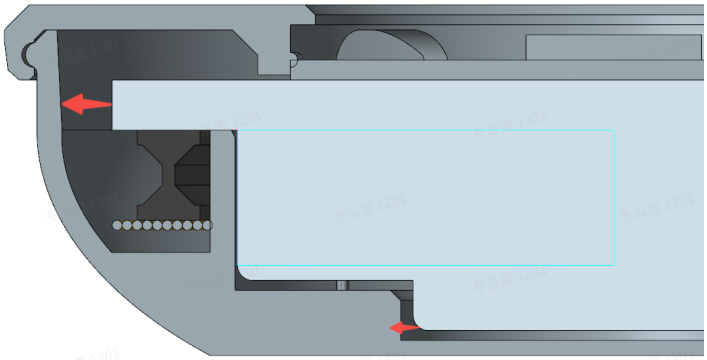
2. 机芯四周的大块铁片为散热片，温度较高，可能造成材料软化，不建议打印件直接与其接触。
3. 如需要使用螺丝安装机芯，请使用316/尼龙等无磁材质的螺丝避免对机芯产生干扰
4. 机芯电源接口的引脚较长，设计时建议注意引脚与机芯之间的距离，预留好安装过程中与安装后的空间。
5. 安装电源接口建议先将其小心的从机芯下拆下，安装到侧壁上再安装回机芯，以防止电源线过度扭转
6. 机芯上的触摸开关用于控制浮子灯，需要将无元器件的平面贴在厚度不超过3mm的平面上，超出此厚度可能导致开关不灵敏。用胶水，普通双面胶与创客宝库中的双面胶固定均可。同时建议在安装平面的两侧都绘制标识方便找到开关。
7. 如果需要拆开原装保护壳，请谨慎操作，请勿调节机芯上蓝色电位器旋钮，此举会干扰传感器，导致机芯无法正常工作。



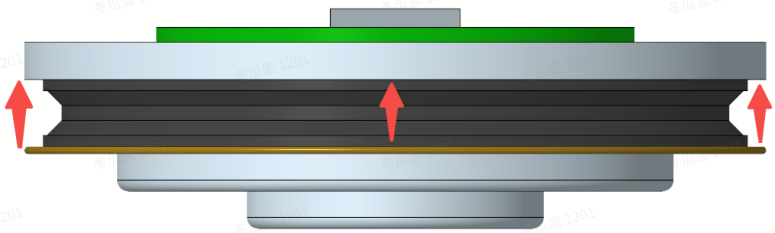
请勿调整电位器
Do not rotate the potentiometer

2. 浮子与模型注意事项

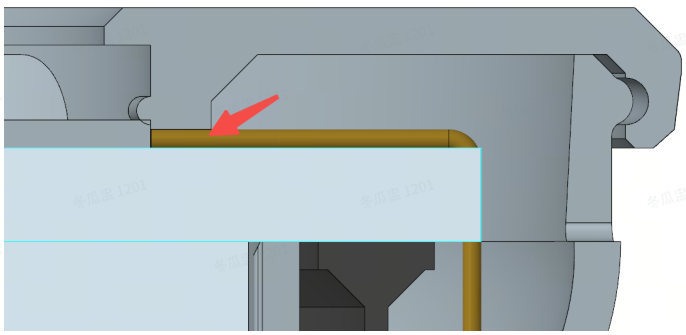
1. 浮子为多块磁铁组装而成，建议设计时除固定段，其他段预留直径1mm左右间隙以防止干涉。



1. 为防止浮子在跌落时损坏，浮子安装壳下方应当完全包裹住浮子。
2. 浮子灯板供电线圈需要距离浮子最上方一级至少4mm以获得充足的功率，距离浮子过近，或距离底座过远均会影响灯光亮度。



3. 线圈连接线处较细，建议至少预留0.4mm高度间隙以防止线圈连接线压断。



4. 灯板元器件距离PCB板边缘较近，请注意零件与元器件干涉风险。

5. 模组的载重约80g（不含浮子）。模型重心越低，模型放置越稳定，套件的载重也能有所上升。

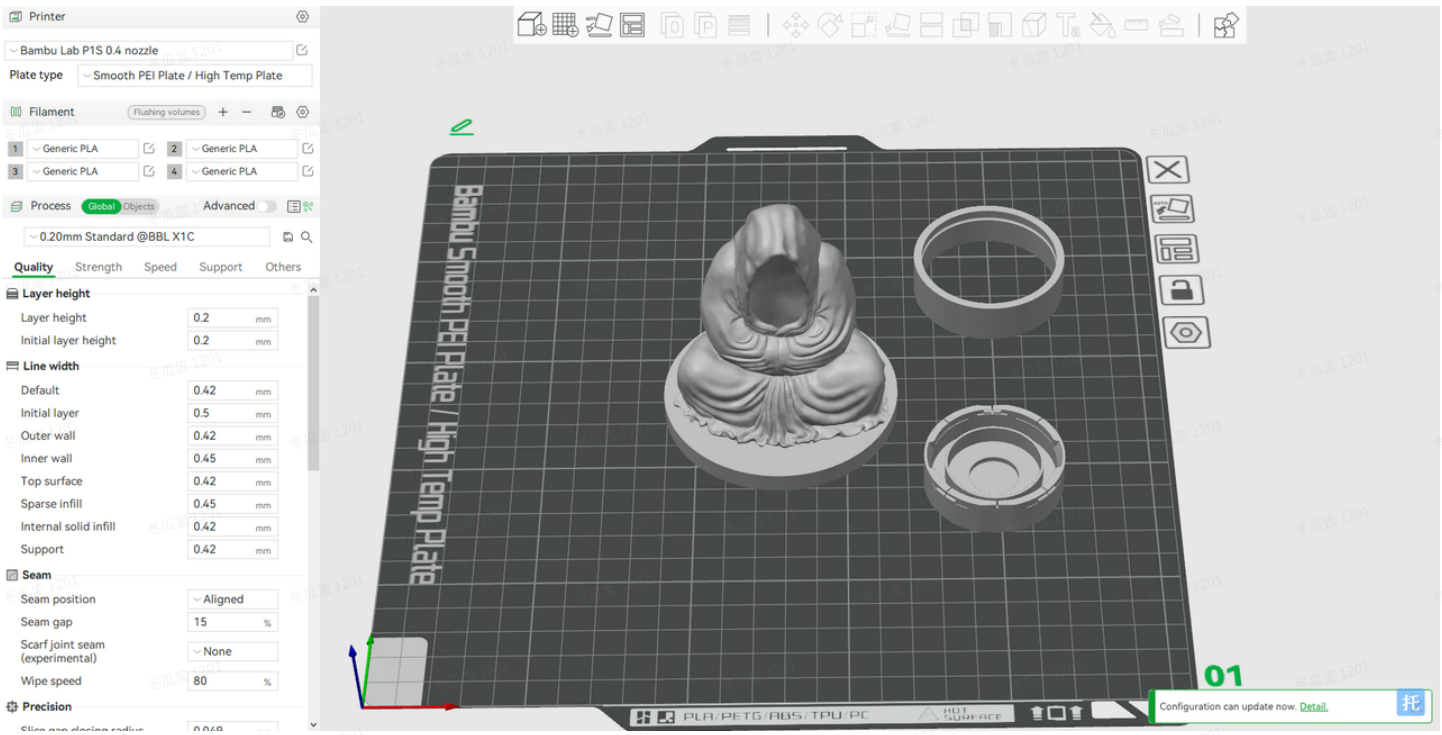
3. 关于辅助工具

对于用户而言，一个合适的辅助工具对于摆放模型有极大的帮助！强烈建议希望向社区分享自己的模型的创作者们制作与模型对应的辅助放置工具，可以帮助用户找到底座的中心并竖直放下模型。3D文件中的辅助工具是一个例子，另外花田小猫的Levitation Pyramid of Time Fragments也展示了一个不错的案例。

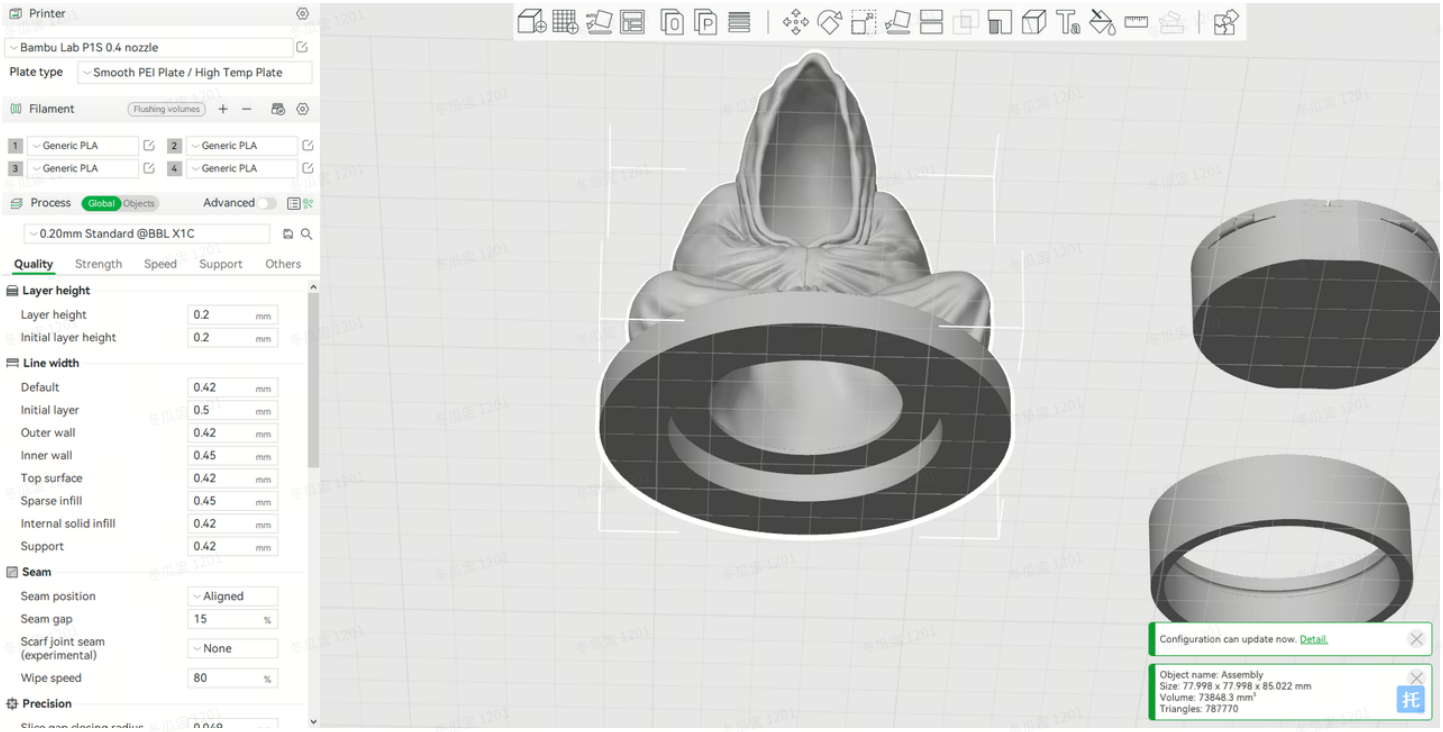
4. 使用3D文件中的模型DIY布尔工具创作悬浮模型

想让模型飞起来？按照下列步骤，可以将模型与浮子结合，让模型浮在空中。以下以@ONI.FORGE的Meditating Reaper LED Candle Holder为例。

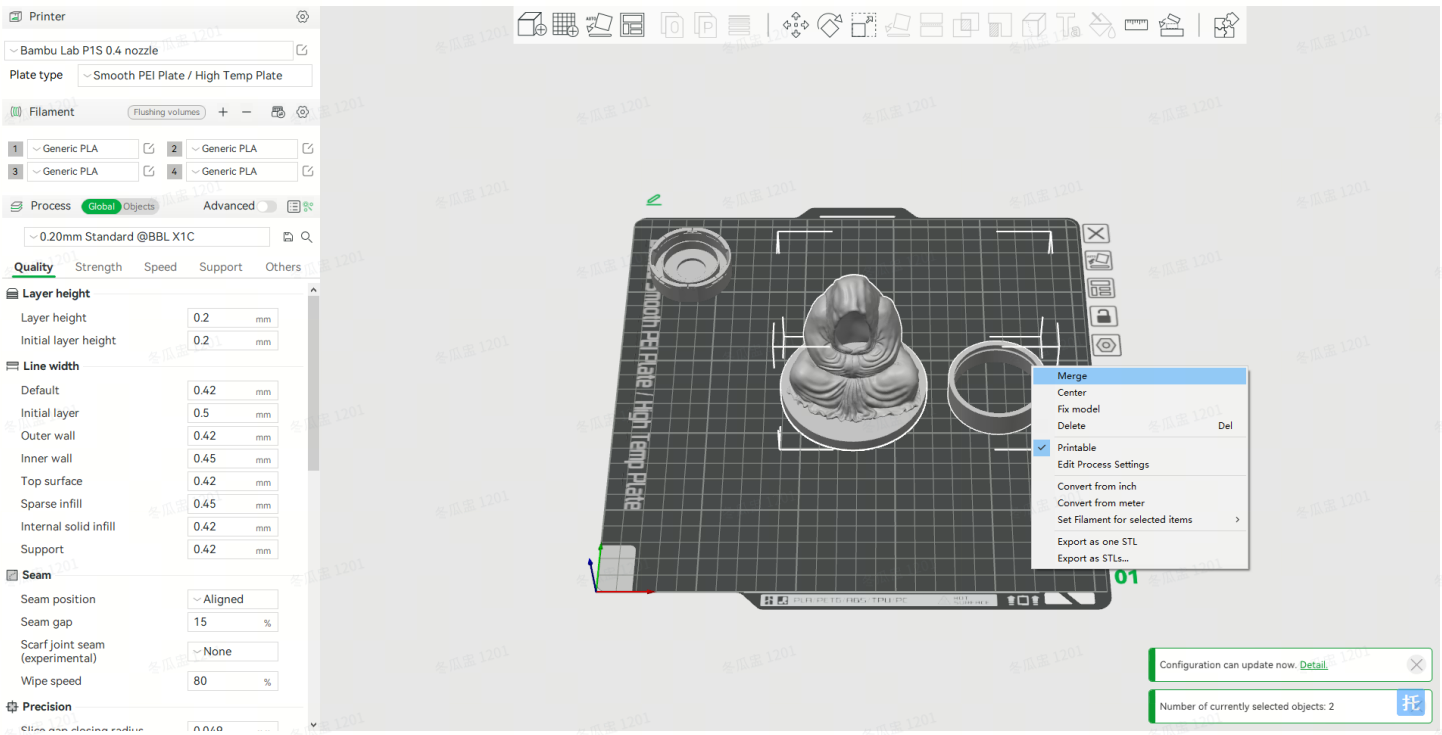
1. 打开想要修改为悬浮模型的文件，并导入模型DIY布尔工具中的底座与盖子

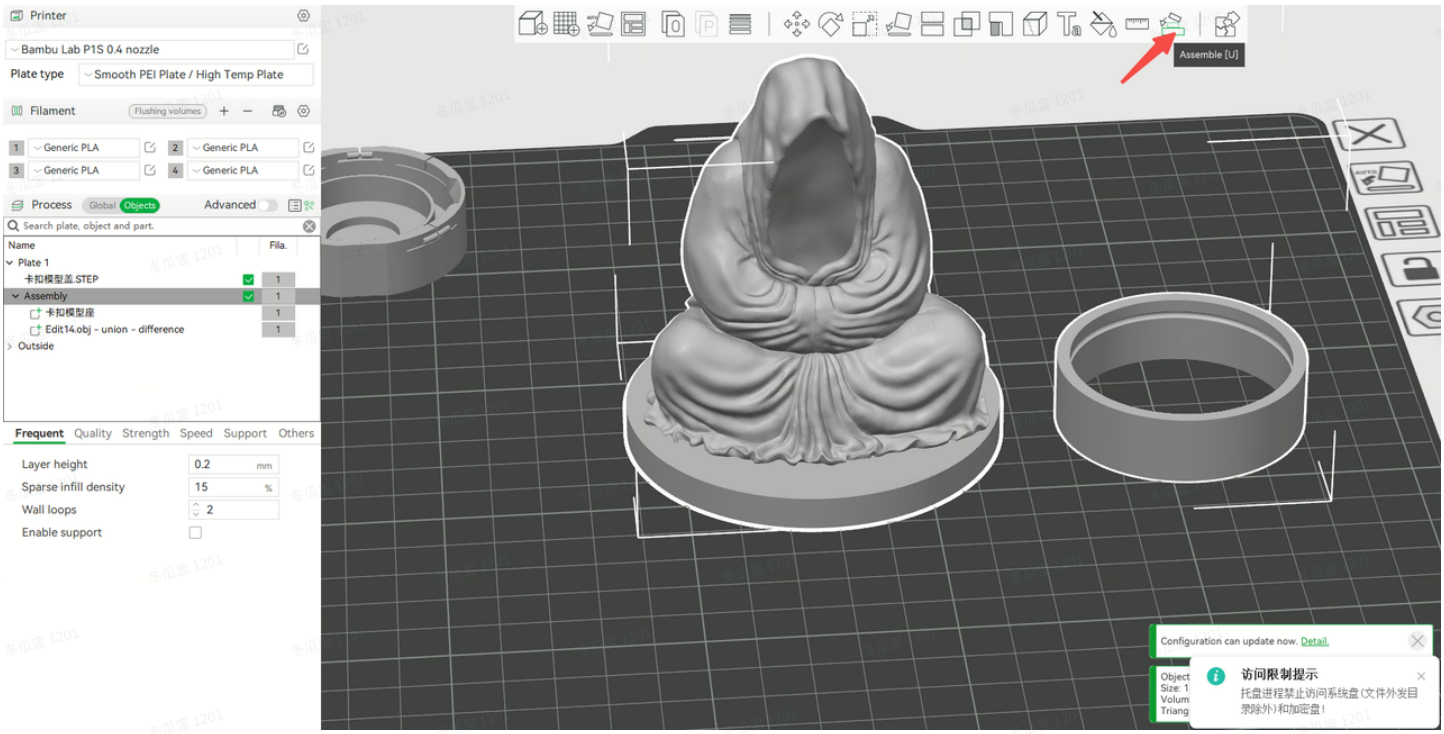


2. 调整模型的大小，并在其中挖出一直径52mm，深6至18mm的空洞。这一深度将决定模型相对浮子的位置与悬浮高度，超出这一范围会导致模型底部与底座接触而无法悬浮。条件允许的情况下，建议悬浮高度为14.6mm。



3. 将布尔工具中的模型座与模型组合，然后使用装配功能，选中两个面并使其对齐




Printer
Bambu Lab P1S 0.4 nozzle
Plate type
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Filament
Flushing volumes
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Name
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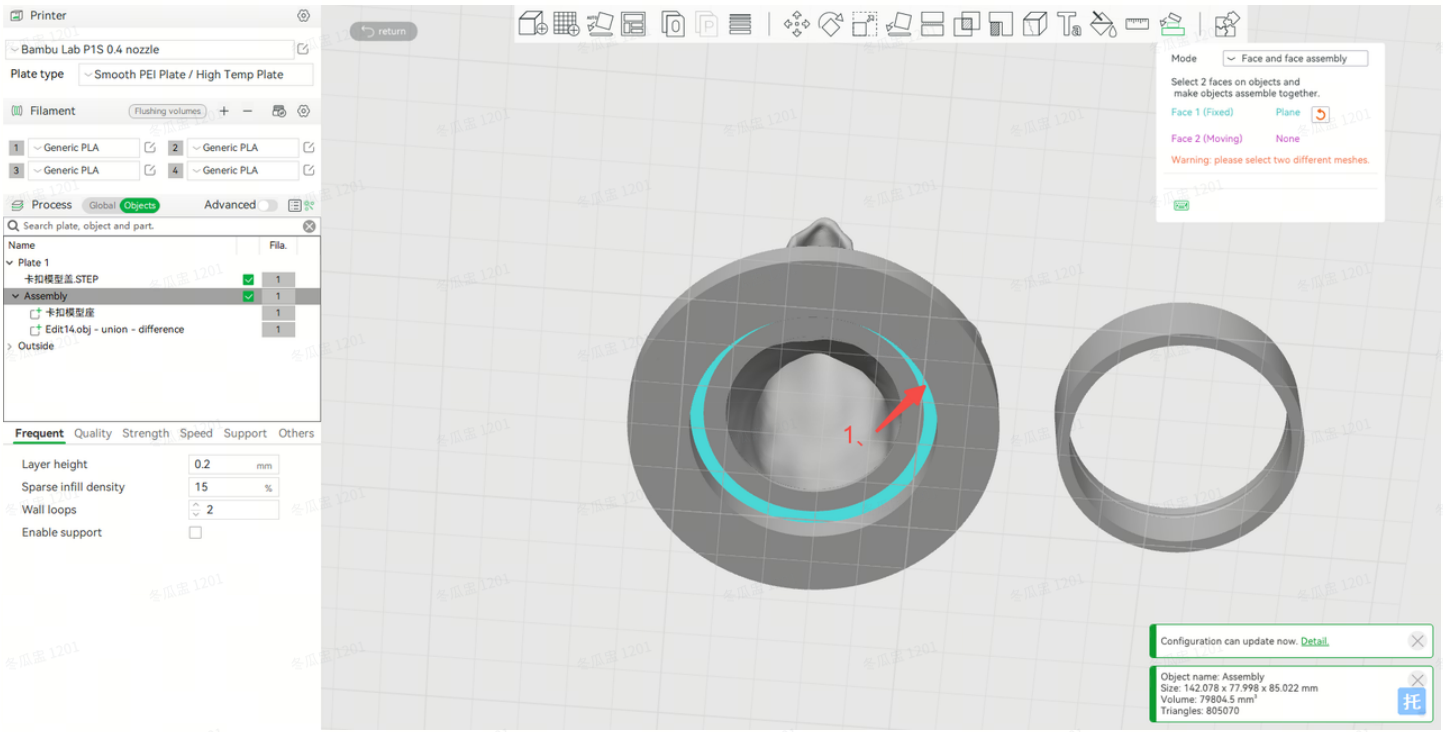
Plate 1
卡扣模型盖.STEP
Assembly
卡扣模型座
Edit14.obj - union - difference
Outside
Frequent
Quality
Strength
Speed
Support
Others
Layer height
0.2
mm
Sparse infill density
15
%
Wall loops
2
Enable support
Assemble [U]
Configuration can update now. Detail.
访问限制提示
托盘进程禁止访问系统盘(文件外发目录除外)和加密盘!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mm
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Wall loops
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return
Mode
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Plane
Face 2 (Moving)
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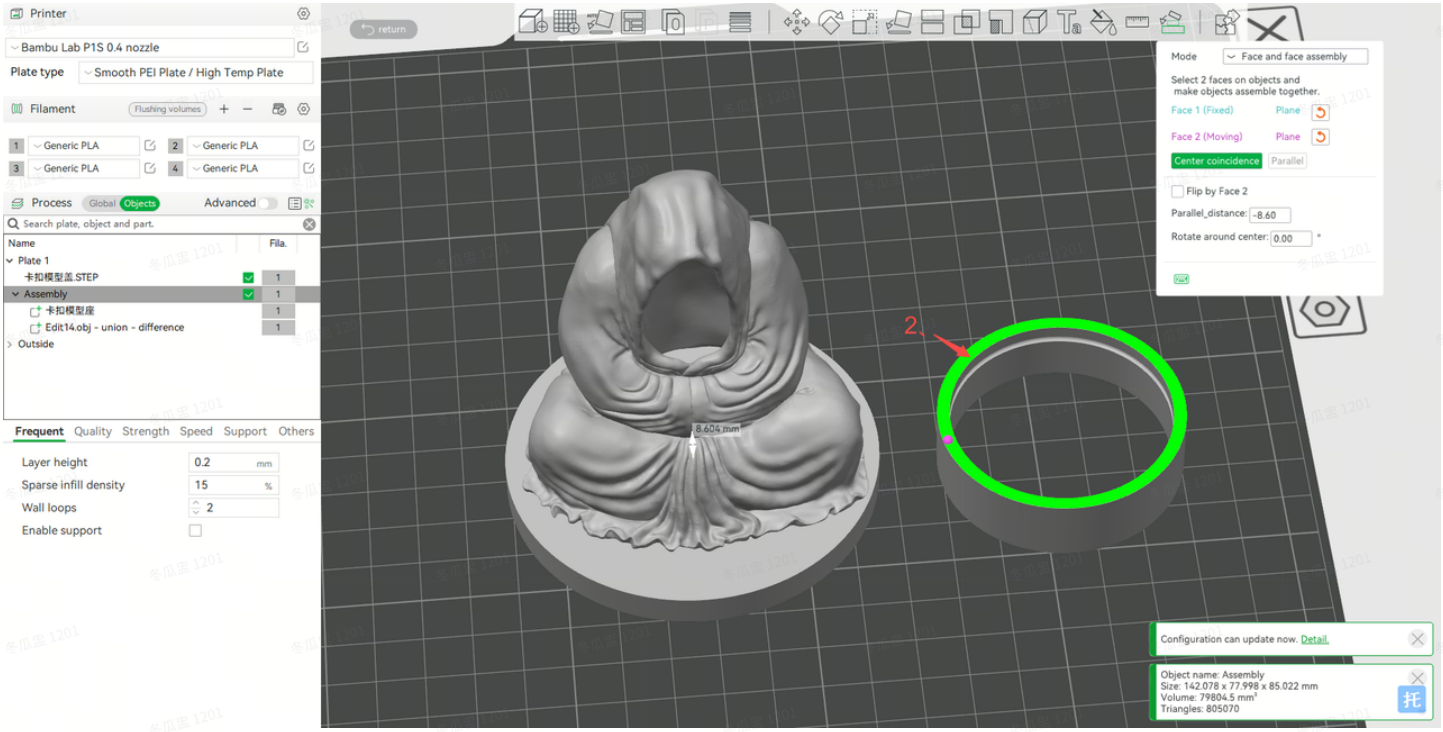
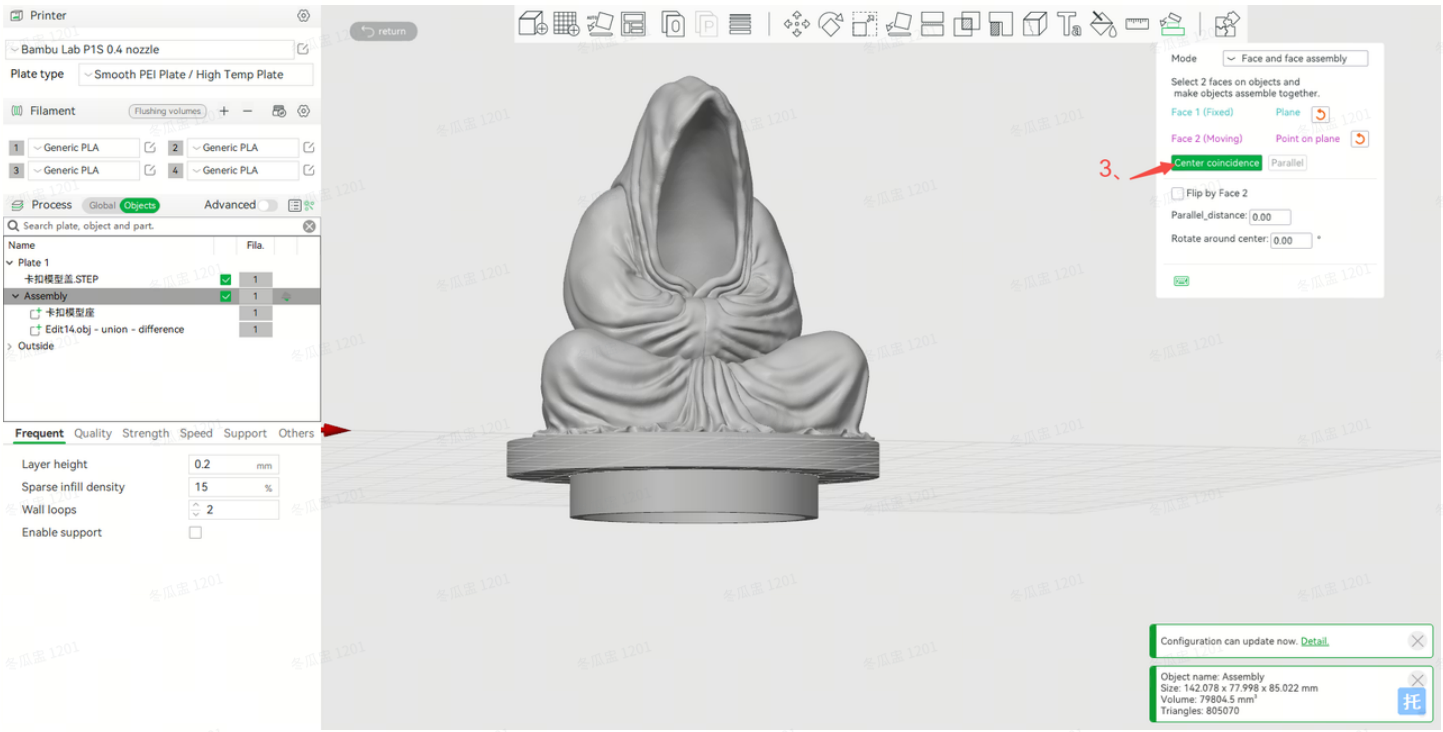
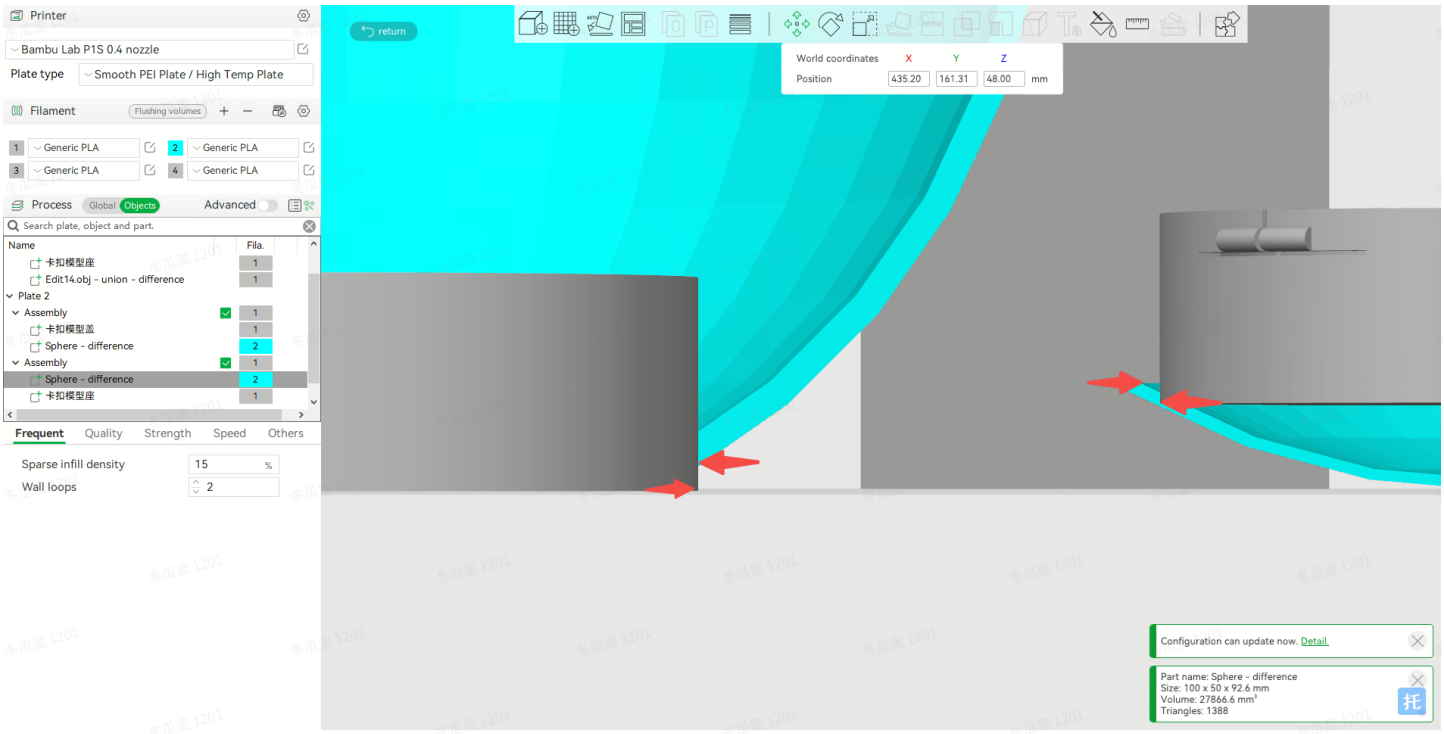
Warning: please select two different meshes.
1、
Configuration can update now. Detail.
Object name: Assembly
Size: 142.078 x 77.998 x 85.022 mm
Volume: 79804.5 mm³
Triangles: 805070

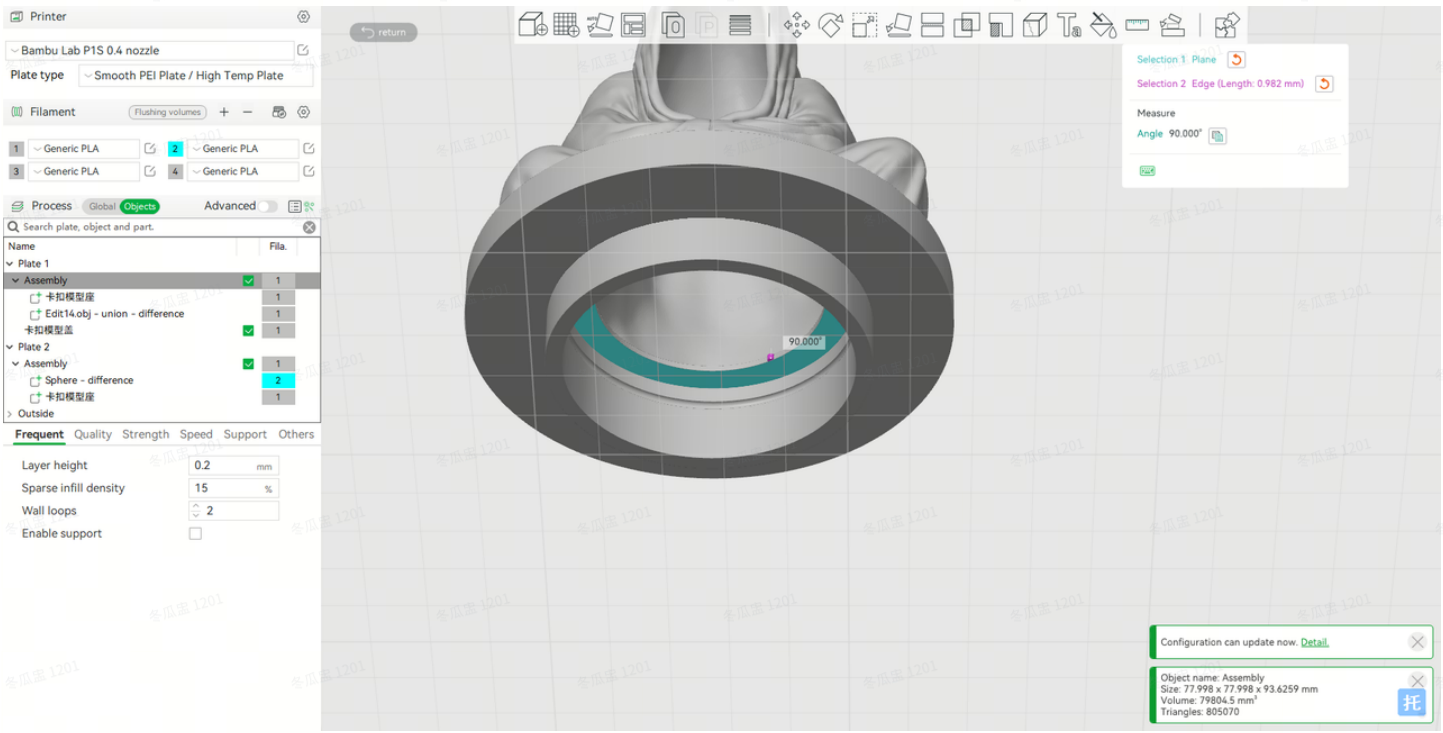




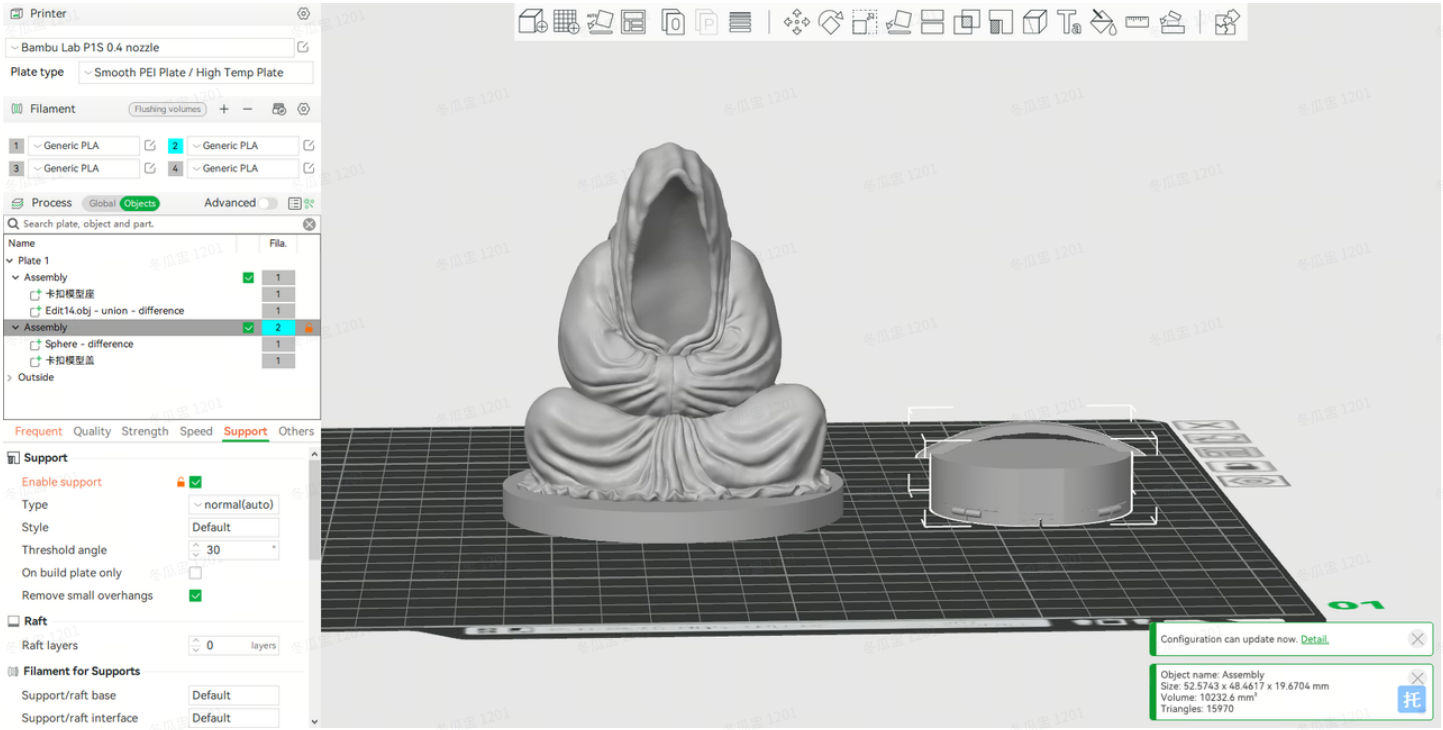
4. 对于浮子帽下部还有特征的模型（例如球体），需要将浮子帽与下部模型结合。注意上下部模型角度与高度的对齐！布尔工具中的浮子帽与模型座高度是对齐的。如图所示，为了将浮子帽与模型下部结合，需要下降一段距离，同时上部模型也要上升相同的距离以对齐高度。



5. 下部模型可以作为浮子帽和模型座之间的限位，对于哪些没有下部的模型，需要对模型上部进行封闭。可以使用外径52，内径37，厚1mm的圆盘接合到模型座的**上方**。



6. 将多余部分切除，对于有下部的模型，要将浮子帽和下部反转并设置支撑



7. 打印，将浮子帽嵌入模型座并欣赏你的模型！

EX：对于重心偏离的模型，一种简单的调整办法是通过在模型上添加修改器至偏轻的一侧，并调整修改器至80%来增加本侧的质量。这种方法仅适用于有一定实心空间的模型。