

《经济学家》读译参考：微缩无线 - 计算机芯片元件无线交互通信 PDF转换可能丢失图片或格式，建议阅读原文

https://www.100test.com/kao_ti2020/254/2021_2022__E3_80_8A_E7_BB_8F_E6_B5_8E_E5_c67_254408.htm Shrinking wireless

微缩无线 THE miniaturisation of the components of computer chips has proved unstoppable. In each new generation, those components are smaller and more tightly packed than they were in its predecessor.

(1) Progress has been so rapid that chip designers are approaching apparently fundamental barriers to further reductions in size and increases in density. One of these is imposed by the need to wire the components in a chip together, so that they can exchange signals.

But, in a miniaturised version of the s_____ to wireless communication in the macroscopic world, a group of researchers led by Alain Nogaret of the University of Bath, in England, think they can make chips whose components talk to each other wirelessly.

事实证明，计算机芯片元件的微型化已经势不可挡。新一代芯片的元件越来越小，压缩也越来越紧密。发展如此之快，致使芯片设计者在进一步缩小元件尺寸、提高元件密集度上逐渐遇到了许多根本性难题。其中之一就是必须将某一芯片中的所有元件用线连接起来，以便于各元件之间可以交换信号。

不过，英国巴思大学的亚莱恩诺加雷特负责的一个研究小组认为，通过在微型条件下实现宏观意义上的无线通信，他们可以制造出具有无线信息交互元件的芯片。

At present, the electronics that transmit and receive the radio waves used in wireless devices are too large to be used within individual chips. But Dr

Nogaret believes he can o_____ this. Last week he and his

colleagues at three other British universities, another in Belgium and a research institute in France won the money to try to build such a device.当前，无线设备中采用的无线电波输送和接收电子器件都过大，无法应用于单个芯片。但是诺加雷特博士相信可以解决这一问题。上周，他和来自另外三所英国大学、一所比利时大学以及法国一研究院的同事们争取到了研制这一设备的资金。The researchers intend to use the standard lithographic[1] techniques employed in chipmaking to coat a semiconductor with microscopic magnets. (2) These magnets will generate local magnetic fields that point in opposite directions at different points on the chips surface. Electrons have a property called spin[2] that is affected by magnetic fields, and the team hopes to use an effect called inverse electron-spin resonance to make electrons passing through the chip emit microwaves.研究人员拟应用芯片制作中所用的标准平版印刷技术，将许多极小的磁铁包被到一块半导体上。这些磁铁可产生局部磁场，从相反的方向作用于芯片表面不同位点。电子具有一种自旋特性，可受磁场影响，因此研究小组希望利用一种“反电子自旋谐振”效应，让穿过芯片的电子发射微波。The technique they are proposing is the r_____ of the process in medical magnetic-resonance imaging. (3) In MRI, the patient is placed in a strong magnetic field that causes some of his bodys atomic nuclei, which act like tiny magnetised spinning tops, to align[3] themselves with the field. These nuclei are then zapped[4] briefly with a second magnetic field that knocks them out of alignment with the first one. The coils in the scanning apparatus detect these magnetic changes, which are used to

build up a map of the part of the body being examined. After a few seconds, the nuclei realign themselves with the field, radiating small amounts of energy as heat or, more rarely, as radio waves.他们计划采用的此项技术与医学上的核磁共振成像（MRI）过程恰好相反。MRI是将患者置于某一强磁场中，该磁场可让患者机体原子核（其运动类似于磁化的陀螺）顺着磁场方向排列。然后，用第二个磁场短时轰击这些原子核，使其脱离第一个磁场阵列。扫描仪上的线圈探测到这些磁场变化，并以此构建出患者受检部位的图谱。几秒钟后，原子核沿磁场方向重新排列，同时放射出少量热能或者无线电波（较少见）。In chips, Dr Nogaret proposes to use the spin of the electron rather than the spin of the atomic nucleus. Electrons flowing through the chip would “see” a magnetic field that flips from one direction to the opposite every few hundred nanometres (billionths of a metre). This is the equivalent of zapping a stationary object with an oscillating[5] magnetic field of the sort used in MRI. The changing magnetic field would force the electrons to oscillate, too, but would not allow them to radiate heat. As a result, they would be forced to emit radio waves or, rather, microwaves, which are s_____ but of shorter wavelength. 而就芯片而言，诺加雷特博士打算利用电子而非原子核的自旋。穿过芯片的电子可以“识别”某一磁场，该磁场每隔几百纳米（十亿分之一米）就变换一次方向。这相当于不断摆动MRI中的磁场，并令其轰击某一静止物体。不断变化的磁场也可促使电子来回摆动，但不使其散射热能。这样一来，电子仅可发射无线电波或者更好是微波，后者与无线电波类似，但波长较短。（4）Dr Nogaret envisages great

advances that would stem from the success of his work, and these are not confined to the possibility of packing components yet more tightly. In today's chips, the failure of a single connection can put the whole circuit out of action. This should not happen with a wireless system because it could be programmed to re-route[6] signals.

Manufacturers could thus relax _____ their standards and produce chips that were cheaper than, but as reliable as, their predecessors. 诺加雷特博士设想此项工作一旦成功将会带来重大突破，而且不仅仅局限于将各元件压缩得更为紧密。目前的芯片某一条连接出现故障就可能导致整个电路无法运转，而采用无线系统就不会发生这样的问题，因为可以通过程序控制将信号改道。这样的话，制造商就可以放宽标准，生产出比以前便宜但质量同样可靠的芯片。_____。（这个项目不会是一帆风顺的。）

Generating microwaves powerful enough to transmit data reliably will probably involve stacking several layers of magnets and semiconductors together and encouraging the electrons in them to oscillate in unison[7]. But if it works, a whole new wireless world will be opened up. 这个项目不会是一帆风顺的。如要形成足以准确传输数据的强大微波，可能不但需要叠加数层磁铁和半导体，而且要促使其中的电子协调一致的摆动。可它一旦获得成功，就将开启一个全新的无线世界。

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