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HONORABLE COMMISSIONER OF PATENTS AND TRADEMARKS WASHINGTON, D.C. 20231

SIR:

PLEASE RECORD THE ATTACHED ORIGINAL DOCUMENT(S) OR COPY(IES) THEREOF.

1. NAME OF CONVEYING PARTY(IES)

Shanhui Fan
Pierre R. Villeneuve
John D. Joannopoulos

Additional name(s) of conveying party(ies) attached? No

2. NAME(S) AND ADDRESS(ES) OF RECEIVING PARTY(IES)

Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, Massachusetts 02139

Additional name(s) of receiving party(ies) attached? No

3. NATURE OF CONVEYANCE

- X Assignment
Security Agreement
Merger
Change of Name
Other

Execution Date: February 16, 1999

4. APPLICATION NUMBER(S) OR PATENT NUMBER(S)

If this document is being filed together with a new application, the execution date of the application is:

A. Patent Application No(s): 09/228,147

B. Patent No(s):

Additional numbers attached? No

5. NAME AND ADDRESS OF PARTY TO WHOM CORRESPONDENCE CONCERNING DOCUMENT SHOULD BE DIRECTED:

Matthew E. Connors
Samuels, Gauthier & Stevens, LLP
225 Franklin Street
Boston, Massachusetts 02110
(617) 426-9180, Extension 112

6. TOTAL NUMBER OF APPLICATIONS AND PATENTS INVOLVED: 1

7. TOTAL FEE DUE: \$40.00 (Enclosed)

If any additional fee(s) are due, the Commissioner is hereby authorized to charge the Deposit Order Account noted in item 8.

8. DEPOSIT ACCOUNT NUMBER: 19-0079

9. STATEMENT AND SIGNATURE

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Matthew E. Connors
Name of Person Signing

Matthew E. Connors
Signature

2/23/99
Date

Total number of pages including cover sheet, attachments, and document: 3

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Linda M. White
Linda M. White

Date: 2/23/99

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PATENT
REEL: 9802 FRAME: 0671

**ASSIGNMENT**

Know all men by these presents that:

WHEREAS we,           Shanhui Fan  
                              50 Porter Street, Apt. # 2  
                              Somerville, MA 02143

and

Pierre R. Villeneuve  
61 Brookline Avenue # 407  
Boston, MA 02215

and

John D. Joannopoulos  
64 Douglas Road  
Belmont, MA 02178

have made an invention for

**RESONANT-TUNNELING ELECTRONIC TRANSPORTORS**

described in the application filed with the United States Patent and Trademark Office on January 11, 1999, as Serial No. 09/228,147, which claims priority from United States Provisional Patent Application Serial No. 60/071,253, filed January 12, 1998;

WHEREAS **Massachusetts Institute of Technology** a corporation duly organized and existing under the laws of **Massachusetts** and having a place of business at **77 Massachusetts Avenue, Cambridge, MA 02139**, for the benefit of itself, its successors and assigns, all inclusively hereinafter referred to as the Assignee, is desirous of acquiring the entire right, title and interest in and to the said invention, the said application, all inventions disclosed in said application and any and all Letters Patent of the United States and of all other countries which may be granted for the said invention or inventions, or any of them;

NOW, THEREFORE, for good and valuable consideration provided by said Assignee, the receipt whereof is hereby acknowledged, we do hereby sell, assign and transfer to the said Assignee the entire right, title and interest in and to the said invention, inventions and application, including all priority rights arising therefrom, all inventions disclosed in said application, and any and all Letters Patent of the United States, and of all other countries, together with the right to apply for such Letters Patent, which may be granted for the said invention, inventions or any of them,

TO HAVE, HOLD AND ENJOY the said invention, the said application, and the said Letters Patent, to said

**Massachusetts Institute of Technology**

its successors and assigns, to its and their own use and behoof to the full end of the term or terms for which the said Letters Patent may be granted, as fully and entirely as the same would have been held and enjoyed by us had this assignment and sale not been made.

**PATENT**  
**REEL: 9802 FRAME: 0672**

AND we hereby authorize and request the Commissioner of Patents of the United States and the appropriate officers of all foreign patent offices to issue any and all Letters Patent which may be granted on the said application or applications above referred to, or for the said invention, or any of them, to the said Assignee in accordance with the terms of this instrument.

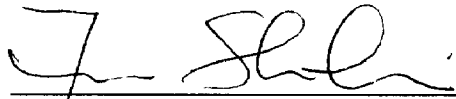
AND we hereby agree to execute and sign without further consideration any other legal document and any other assignments and any divisional, continuing, renewal, reissue or other application in and for all patents that may be appropriate and may be deemed necessary by the Assignee fully to secure to said Assignee its interests as aforesaid in and to the said invention or any part thereof and in and to the said patents or any of them.

AND we further covenant and agree that we will at any time upon request communicate to the said Assignee, its successors, assigns or other legal representatives, any facts known to us relating to the said invention and any patent that may be granted thereon, and will testify as to the same in any interference or litigation when requested to do so.

AND we hereby covenant for ourselves and our legal representatives that we have not hitherto assigned or granted any license to make, use or sell said invention, and that we will not henceforth purport to assign, license or execute any instrument to that effect in conflict with this assignment.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on the dates below.

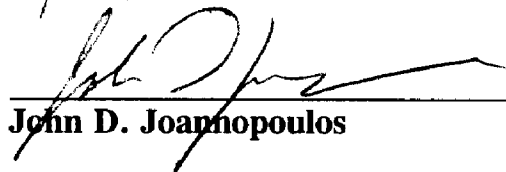
Feb 16, 99  
Date

  
Shanhui Fan

16 Feb, 1999  
Date

  
Pierre R. Villeneuve

16 Feb, 99  
Date

  
John D. Joannopoulos