



U.S. Citizenship
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FILE: [Redacted]
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Office: NEBRASKA SERVICE CENTER

Date: **MAY 06 2008**

IN RE: Petitioner: [Redacted]
Beneficiary: [Redacted]

PETITION: Immigrant Petition for Alien Worker as an Alien of Extraordinary Ability Pursuant to Section 203(b)(1)(A) of the Immigration and Nationality Act, 8 U.S.C. § 1153(b)(1)(A)

ON BEHALF OF PETITIONER:

[Redacted]

INSTRUCTIONS:

This is the decision of the Administrative Appeals Office in your case. All documents have been returned to the office that originally decided your case. Any further inquiry must be made to that office.

Robert P. Wiemann, Chief
Administrative Appeals Office

DISCUSSION: The employment-based immigrant visa petition was denied by the Director, Nebraska Service Center, and is now before the Administrative Appeals Office (AAO) on appeal. The appeal will be sustained and the petition will be approved.

The petitioner seeks classification as an employment-based immigrant pursuant to section 203(b)(1)(A) of the Immigration and Nationality Act (the Act), 8 U.S.C. § 1153(b)(1)(A), as an alien of extraordinary ability in the sciences. The director determined the petitioner had not established the sustained national or international acclaim necessary to qualify for classification as an alien of extraordinary ability.

On appeal, counsel argues that the petitioner meets at least three of the regulatory criteria at 8 C.F.R. § 204.5(h)(3).

Section 203(b) of the Act states, in pertinent part, that:

(1) Priority workers. -- Visas shall first be made available . . . to qualified immigrants who are aliens described in any of the following subparagraphs (A) through (C):

(A) Aliens with extraordinary ability. -- An alien is described in this subparagraph if --

(i) the alien has extraordinary ability in the sciences, arts, education, business, or athletics which has been demonstrated by sustained national or international acclaim and whose achievements have been recognized in the field through extensive documentation,

(ii) the alien seeks to enter the United States to continue work in the area of extraordinary ability, and

(iii) the alien's entry into the United States will substantially benefit prospectively the United States.

Citizenship and Immigration Services (CIS) and legacy Immigration and Naturalization Service (INS) have consistently recognized that Congress intended to set a very high standard for individuals seeking immigrant visas as aliens of extraordinary ability. *See* 56 Fed. Reg. 60897, 60898-99 (Nov. 29, 1991). As used in this section, the term "extraordinary ability" means a level of expertise indicating that the individual is one of that small percentage who have risen to the very top of the field of endeavor. 8 C.F.R. § 204.5(h)(2). The specific requirements for supporting documents to establish that an alien has sustained national or international acclaim and recognition in his or her field of expertise are set forth in the regulation at 8 C.F.R. § 204.5(h)(3). The relevant criteria will be addressed below. It should be reiterated, however, that the petitioner must show that he has sustained national or international acclaim at the very top level.

This petition, filed on November 2, 2006, seeks to classify the petitioner as an alien with extraordinary ability as a researcher in the field of theoretical physics. More specifically, the petitioner's research focuses on quantum optics and quantum information science. At the time of filing, the petitioner was working for the Jet Propulsion Laboratory at the California Institute of Technology.

The regulation at 8 C.F.R. § 204.5(h)(3) indicates that an alien can establish sustained national or international acclaim through evidence of a one-time achievement (that is, a major, internationally recognized award). Barring the alien's receipt of a major internationally recognized award, the regulation at 8 C.F.R. § 204.5(h)(3) outlines ten criteria, at least three of which must be satisfied for an alien to establish the sustained acclaim necessary to qualify as an alien of extraordinary ability. We find that the petitioner's evidence meets at least three of the regulatory criteria.

Evidence of the alien's participation, either individually or on a panel, as a judge of the work of others in the same or an allied field of specification for which classification is sought.

The petitioner submitted electronic correspondence indicating that he reviewed a research proposal submitted to the Army Research Office (ARO) for the Chemical and Biological Defense Basic Research Program. The petitioner also submitted evidence that he reviewed multiple papers submitted for publication in *Journal of Physics B: Atomic, Molecular & Optical Physics*, *Physical Review Letters*, *Physical Review A*, *The European Physical Journal D*, *International Journal of Quantum Information*, *Optics Communications*, and *Advances in Mechanics and Mathematics*. In light of his review of the ARO proposal and numerous research papers submitted for publication in the preceding journals, the petitioner has established that he meets this criterion.

Evidence of the alien's original scientific, scholarly, artistic, athletic, or business-related contributions of major significance in the field.

The petitioner submitted several letters of support discussing his research contributions. We cite representative examples here.

Dr. Colin Williams, Laboratory Senior Research Scientist and Program Manager, Advanced Computing Paradigms, Jet Propulsion Laboratory, California Institute of Technology, states:

Throughout his time at JPL, [the petitioner] has made, and continues to make, seminal contributions to quantum metrology and quantum computing, as evidenced by his publication of a steady stream of high quality research papers in the foremost physics journals in the world. In particular, his expertise in Bose Einstein Condensates (BEC) led to the development of a new design for an on-chip atomic gravity gradiometer, and his optics expertise led to the discovery of a new method for synthesizing a special type of optical state needed for optical quantum computers. Both are major contributions to quantum technology. The BEC gravimeter is important because this would allow for a dramatically smaller gravitational sensor than is possible today. Optical quantum computers are one of the more promising directions for achieving practical quantum computing devices for simulating physical systems, and breaking codes, beyond the reach of any current or conceivable supercomputer. In addition, [the petitioner] worked with me on making a new optical photo-lithography technique, called quantum lithography, more practicable. Specifically, [the petitioner] discovered a way to eliminate the need for an exotic multi-photon absorbing resist and instead found a novel way to use a conventional photo-resist. This has the potential to revolutionize microprocessor fabrication.

Dr. Jonathan Dowling, Professor of Physics and Co-director of the Hearne Institute of Theoretical Physics, Louisiana State University, states:

[The beneficiary's] work on manipulating the rotational or vortex states of the Bose Einstein Condensates (BEC) via optical angular momentum beams is an important step ahead as it offers a qubit that is robust and easy to measure and manipulate. Another unique fundamental advantage offered by this work is that it is a first example of coherent coupling of angular momentum beams of light with atomic degrees of freedom, in the sense that both the amplitude and phase information can be transferred from the angular momentum of light to the vortex state of the BEC. The prime application of this work is in the area of inertial sensing, and it could help development of ultra-precise gyroscopes using the BECs.

Dr. Martin Holthaus, Professor of Physics and Chair for Condensed Matter Theory, University of Oldenburg, Germany, states:

In 2003, [the petitioner] co-authored a paper published in the top international journal *Physical Review Letters* about numerical work on Free Electron Lasers (FELs) without Inversion. [The petitioner], who had worked on this topic already during his studies in Bombay, provided decisive input to this work, which, in effect, constitutes the first proof of principle that lasing without inversion is possible with FELs. Thus, this work has created genuine excitement in the expert community.

Dr. Girish Agarwal, Nobel Foundation Chair and Regents' Professor, Department of Physics, Oklahoma State University, states that the petitioner has made "seminal contributions to the field of Bose-Einstein Condensation (BEC), in particular, to the problem of understanding the statistical properties of the condensate." Dr. Agarwal further states:

These studies offered several never-known-before insights into the properties of the new state of matter of the BEC. Further[,] [the petitioner] suggested a unique experimental handle on controlling the nature-given spontaneous emission properties of the atom and thus offering a novel way to reduce noise in variety of applications of light-atom interaction.

Further accomplishments of [the petitioner] include his leading role in giving a new direction to an extremely difficult problem in Molecular Physics, to devise accurate and easy to calculate wavefunctions for the molecules. The promise of this work lies in the fact that it allows development of physically motivated compact wavefunctions for molecules and considerably reduces the computational effort required in the determination of the molecular properties. This work is truly outstanding and would have a long-term impact in the study of molecules for years to come.

Dr. Muhammad Suhail Zubairy, Professor of Physics and Associate Director, Institute for Quantum Studies, Texas A&M University, states:

Recently, [the petitioner] has made a seminal contribution to the field of slow and fast light. This field involves a manipulation of the speed of the pulse of light for a variety of applications, including

an enhancement of optical nonlinear effects, acousto-optic effects, a new type of quantum memories for applications in quantum information protocols, and a controllable true-time delay for phased-array radar devices for military and space applications. [The petitioner] . . . devised a scheme for controlling the group velocity of a pulse of light via a specially prepared atomic medium in an extremely wide range, starting from subluminal to superluminal regimes. The external handle that allows this control is the relative phase of the applied light fields used to prepare the atomic medium. Such an easy to control handle was missing in all previous proposals in the manipulation of the group velocity of light pulses. Thus, [the petitioner] has provided an extremely applicable scheme for the manipulation of the speed of light pulses.

Dr. Shi Yao Zhu, Professor of Physics, Hong Kong Baptist University, states:

[The petitioner] was instrumental in developing an experimentally feasible scheme for controlling the spontaneous emission of an atom. Spontaneous emission is the source of the noise in lasers and the unwanted errors in quantum information proposals. . . . [The petitioner's] work stands out due to the simplicity it offers for experimental implementation. This work was also innovative as it allowed us to make a use of incoherent (commonly available) light sources to achieve the quantum interference required to obtain a control over the spontaneous emission from an atom.

* * *

I am also familiar with his other seminal works in the area of Bose-Einstein Condensation (BEC), the Quantum Logic Gates between non-neighboring particles via cavity quantum electrodynamics, atom localization, determination of atomic center-of-mass wavefunction and coherent coupling of orbital angular momentum of light with the rotational states of the BEC, and tunable control of a group velocity of light pulse passing through a medium to obtain sub- and super-luminal propagation. Thus, [the petitioner] has mastered and made significant contributions to a wide range of topics in Quantum Optics and Quantum Information Science in a very short period of time.

Dr. Marlan Scully, Director of the Institute for Quantum Studies and the Center for Theoretical Physics, Texas A&M University, is an elected member of the National Academy of Sciences. Dr. Scully states:

[The petitioner's] work in the BEC area addresses several fundamental questions related to the phase transitions and the condensate statistics that provides significant contributions to the same. He has also made significant contributions to Quantum Optics through his theory proposals for Spontaneous Emission Quenching and the Tunable control of the group velocity of a pulse of light. I am certain that his work on achieving Quantum Logic Gate between any pair from a long chain of quantum bits will have far-reaching consequences for practical implementations in the field of Quantum Information.

Dr. Berthold-Georg Englert, Professor of Physics, National University of Singapore, states:

[The petitioner's] contributions to Quantum Optics and Quantum Information have been, and continue to be, very profound and original. For example, his work in the area of quantum statistical

properties of the so-called Bose-Einstein condensate has received international acclaim. . . . [The petitioner] is undoubtedly a pioneer in this area.

[The petitioner] is recognized for his novel contribution to other emerging areas of Quantum Computation. . . . [The petitioner's] non-local quantum logic gate proposal is an extremely important step in increasing the speed of quantum logic operations and reducing the number of resources necessary and is published in the prestigious physics journal *Physical Review A*. Adaptations of [the petitioner's] scheme for different realizations of quantum computation shall be extremely beneficial for the field and shall be of very high value for the U.S.' interest in making Quantum Computation and Communication technology practical.

Quantum cryptography is a new area of research that offers protocols for highly secure communication at a security level that cannot be attained via the prevalent communication protocols. . . . [The petitioner's] scheme for protecting quantum information while sensing the presence of photon in the fiber is extremely important for the technical implementation of quantum communication protocols. It is also important for photonic quantum computation in protecting the quantum information or performing quantum logic operations, which are vital to the design and construction of all future quantum computers and quantum communication networks.

Dr. Gong Chen, Professor of Mathematics and Aerospace Engineering, Texas A&M University, states:

[The petitioner] has developed several novel techniques for the field of Quantum information. I would like to name a few of his excellent contributions that will have far-reaching impact in this field: (1) Development of non-local quantum phase gate operation to speed up quantum information processors and to reduce errors; (2) Development of a polarization preserving quantum non-demolition photodetector for protection of quantum information in light based quantum information processors; (3) Design of a new form of a qubit based on topological vortex states in Bose-Einstein condensates and methods to create, manipulate and measure them. All these works, I am sure, are going to have a long-term impact on the field of Quantum Information

Dr. Jin-Yue Gao, Professor of Physics, Jilin University, China, states:

[The petitioner] offered an original method that externally controls spontaneous emission via interference between two incoherent pump processes. His method allows control of two spontaneous emission processes at once by introducing two incoherent processes that effectively cancel spontaneous emission processes without any of the spontaneously generated coherence required by previous schemes and which is difficult to obtain in an experiment. Furthermore, [the petitioner's] scheme is innovative as it eliminated a major restriction that was present in the prior schemes by allowing the two excited states to be sufficiently separated from each other in energy and yet maintaining control over spontaneous emission from them.

In a novel study, [the petitioner] used quantum coherence effects in atomic systems to obtain control of the group velocity of a weak probe pulse by offering a simple controlling mechanism via the relative phase of the applied fields. Phase control in atom-light interaction is extremely desirable as it offers easy experimental control. [The petitioner's] scheme offers a wide range of tunability for the group velocity; as it can be changed from subluminal to superluminal just by varying the relative phase of the drive fields. Control of group velocity of a probe pulse is extremely important in optical communication schemes and quantum information protocols.

In support of the preceding experts' statements, the petitioner submitted documentation showing dozens of independent cites to his published findings. These citations are solid evidence that other researchers have been influenced by the petitioner's work and are familiar with it. This large number of citations corroborates the experts' statements that the petitioner has made contributions of major significance in his field. The record reflects that the petitioner's original scientific contributions are important not only to the research institutions where he has worked, but throughout the greater field as well. Leading experts from around the world have acknowledged the value of the petitioner's work and its major significance to his field.

In light of the above, the petitioner has established that he meets this criterion.

Evidence of the alien's authorship of scholarly articles in the field, in professional or major trade publications or other major media.

The petitioner submitted evidence of his authorship of numerous articles in publications such as *Journal of Physics B: Atomic, Molecular & Optical Physics*, *Physical Review Letters*, *Physical Review A*, and *Optics Communications*. The petitioner also submitted evidence of dozens of articles that cite to his work. These numerous citations demonstrate the significance of the petitioner's articles to his field. As such, the petitioner has established that he meets this criterion.

In this case, the petitioner has satisfied three of the regulatory criteria required for classification as an alien of extraordinary ability. Pursuant to the statute and regulations, the petitioner qualifies for classification sought.

In review, while not all of the petitioner's evidence carries the weight imputed to it by counsel, the totality of the evidence establishes an overall pattern of sustained national acclaim and extraordinary ability. The petitioner has also established that he seeks to continue working in the same field in the United States and that his entry into the United States will substantially benefit prospectively the United States. Therefore, the petitioner has overcome the stated grounds for denial and thereby established eligibility for immigrant classification under section 203(b)(1)(A) of the Act.

The burden of proof in visa petition proceedings remains entirely with the petitioner. Section 291 of the Act, 8 U.S.C. § 1361. The petitioner has sustained that burden. Accordingly, the decision of the director denying the petition will be withdrawn and the petition will be approved.

ORDER: The appeal is sustained and the petition is approved.